

# DHS-220 Dual Processing System Quick Start Guide

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## PRO Scientific DHS-220 – Dual Processing System

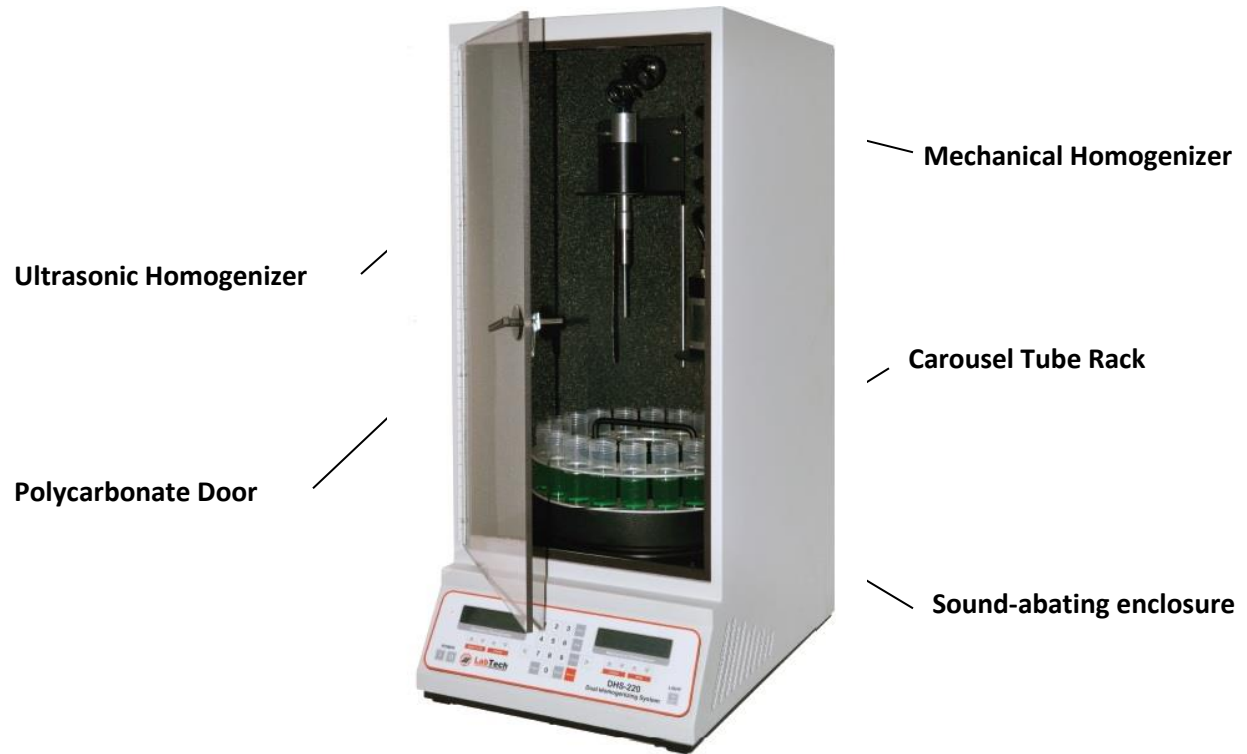


Figure 1. DHS-220 Dual Processing System

## Unpacking

**\*\*UPON RECEIVING THE DHS-220 IN THE CUSTOMER'S FACILITY, IT IS RECOMMENDED THAT THE CUSTOMER DOES NOT REMOVE THE DHS-220 FROM THE SHIPPING CRATE WITHOUT THE REP OR DISTRIBUTOR BEING PRESENT.\*\***

1. Inspect the crate for any outside damage. If there is any visual damage to the shipping crate make note of such damage.
2. Remove the eight (8) screws holding the cover to the crate and remove the cover.
3. Remove from inside the crate any loose shipping material as well as any accessory boxes.
4. Remove the ten (10) screws holding the side shell to the base of the crate and remove the side shell.
5. Carefully remove the DHS-220 from the crate and place it on a surface strong enough to support the unit. It is recommended that two (2) people lift the DHS-220 from the crate.
6. Check the DHS-220 for any visual damage especially if damage to the crate was noted as mentioned in step #1.
7. Attach the power cord to the back of the DHS-220 and plug it into an properly grounded outlet with voltage matching the voltage noted on the rear label of the DHS-220. **DO NOT TURN THE POWER ON YET!!!**
8. Open the front door of the DHS-220 and remove any shipping materials that might have been placed inside of the unit. **DO NOT TRY AND REMOVE THE FOAM PAD THAT THE MOTOR HEADS ARE HOLDING IN PLACE.**
9. With all material except for the foam shipping pad removed from inside of the unit turn the main power switch located on the rear panel to the "ON" position.
10. With the power turned on the motor heads will start to retract to their upper most position. During their movement upward you will hear a slight beeping sound indicating that the motor heads are retracting. Once the motor heads have moved upward off the top of the foam shipping pad and before the motors are fully to their upper most position, remove the foam shipping pad.

**\*\*DO NOT THROW THE FOAM SHIPPING PAD AWAY – KEEP THIS PAD FOR WHEN THE DHS-220 NEEDS TO BE MOVED.\*\***

11. Once the motor heads have retracted to their upper most position the turntable will start to index to its zero position. The foam shipping pad needs to be removed before the turntable starts to index.
12. At this point you should follow the Initial Start Up Steps and do an inspection of the alignment of the mechanical head and the ultrasonic head to the carousel

## Safety Information

- Never run the instrument with the door open.
- Never place hands or any other part of the body inside the cabinet while the instrument is running.
- Do not try to add or remove a test tube while the instrument is running.
- Do not try and add material to a test tube while the instrument is running.
- Use of any accessories or attachments other than those supplied by the manufacturer may be hazardous.
- Running a mechanical generator or an ultrasonic probe without a liquid media can cause damage to the generator or probe.
- Do not grab the generator or the probe while running.

## Setup / Operating Instructions

### Initial Setup

(See startup menu in menu diagrams from main DHS-220 operating manual for additional information)

1. The DHS-220 should be unpacked and placed on a bench top strong enough to support an 85 pound object. Care should be taken as to not block the air flow inlets located on both sides of the housing as well as the fan located on the back of the housing.
2. Check that the voltage quoted on the label located on the back of the housing agrees with the available main voltage. Variations of +/- 10% are permissible.
3. Make sure that the switch located in the power input module on the back side of the housing is in the off (O) position.
4. Insert the female end of the power cord into the power inlet module located on the back side of the housing and plug the other end into a properly grounded outlet.
5. Turn the switch located in the power input module on the back side of the housing to the on (-) position. At this time the internal fan will be on. This fan will run as soon as the unit is energized even if the ON/OFF button on the front panel has not been pressed.
6. Once the On/Off button is pressed on the front panel and power initiated, the two (2) LCD's on the system front panel will show the following:

**LabTech**

**Model Number: DHS-  
220**

7. After approximately 5 seconds the two (2) LCD's will change to the following

**Manual or Program?**

**Manual: Press 1**

**Program: Press 2**

8. Once the power has been turned on, the system will go through a “Zero Position Check”. This means that both the ultrasonic and the mechanical homogenizers will travel up to the full up position also known as the “Zero Position”. During this travel you will hear a slight beeping sound. When the homogenizers have reached their “Zero Position” the turntable will then index until it has reached its “Zero Position”. When the turntable has reached its “Zero Position” it will index slightly off the “Zero Position” and then back to the “Zero Position” making sure that it is properly set. At this time, both homogenizers and the turntable are in the proper “Zero Position”.

## Alignment of the Probes to the Carousel

**\*\*NORMAL TRANSPORTATION CONDITIONS CAN POTENTIALLY ALTER COMPONENT ALIGNMENT DURING SHIPPING. AN ALIGNMENT CHECK MUST BE MADE BETWEEN THE MECHANICAL GENERATOR AND ULTRASONIC PROBE TO THE CAROUSEL PRIOR TO RUNNING. TO DO SO PLEASE FOLLOW THE FOLLOWING ALIGNMENT INSTRUCTIONS.\*\***

### Alignment of the Mechanical Generator to the Carousel

1. Load the carousel with the tubes that you are going to be using and then load the carousel into the DHS-220. There is no need to have anything in the tubes at this time.
2. From the front panel select to run “Manual” and press “1”.
3. Follow the prompting that appears on the front panel as well as the instructions “Running in the Manual Mode – Mechanical” found on page 21. The only thing that you are looking to do is to be able to index the carousel and to raise and lower the mechanical generator into the tubes within the carousel.
4. At no time do you want to press the “Start” button.
5. With the mechanical generator located above position “1” on the carousel, lower the generator slowly into the tube.
6. As you lower the generator you will be able to see if the generator is aligned to the center of the tube in position “1”.
7. If the generator is not located in the center of the tube in position “1” then an alignment must be made.
8. There are two (2) movements that can be made to the mechanical generator, “in and out” as well as “right and left”.
9. If you need to move the generator to the right or left to get to the center of the tube you need to loosen the four (4) shoulder screws holding the motor bracket to the up/down mechanism. With all four (4) shoulder screws loosened you will be able to move the generator to the right or to the left. Once you have moved the generator to the center of the tube retighten all four (4) shoulder screws.

10. If you need to move the generator in or out to get to the center of the tube you need to loosen the four (4) screws located on the bottom of the motor bracket holding the motor in place. With all four screws loosened you will be able to move the generator in or out. Once you have moved the generator to the center of the tube retighten all four (4) screws.
11. Sometimes you may need to have the four (4) shoulder screws holding the motor bracket as well as the four screws holding the motor all loose at the same time to get to the center of the tube.
12. Once you have aligned the mechanical generator to the center of the tube in position “1” in the carousel you need to index the carousel and check for alignment in all other positions. If you are properly aligned in position “1” you should be properly aligned in all the other positions as well.

### Alignment of the Ultrasonic Probe to the Carousel

1. Load the carousel with the tubes that you are going to be using and then load the carousel into the DHS-220. There is no need to have anything in the tubes at this time.
2. From the front panel select to run “Manual” and press “1”.
3. Follow the prompting that appears on the front panel as well as the instructions “Running in the Manual Mode – Ultrasonic” found on page 18. The only thing that you are looking to do is to be able to index the carousel and to raise and lower the ultrasonic probe into the tubes within the carousel.
4. At no time do you want to press the “Start” button.
5. With the ultrasonic probe located above position “17” on the carousel, lower the probe slowly into the tube.
6. As you lower the probe you will be able to see if the probe is aligned to the center of the tube in position “17”.
7. If the probe is not located in the center of the tube in position “17” then an alignment must be made.
8. There are two (2) movements that can be made to the ultrasonic probe, “in and out” as well as “right and left”.
9. If you need to move the probe to the right or left to get to the center of the tube you need to loosen the four (4) shoulder screws holding the ultrasonic converter bracket to the up/down mechanism. With all four (4) shoulder screws loosened you will be able to move the probe to the right or to the left. Once you have moved the probe to the center of the tube retighten all four (4) shoulder screws.
10. If you need to move the probe in or out to get to the center of the tube you need to loosen the four (4) screws located on the bottom of the converter bracket holding the converter in place. With all four screws loosened you will be able to move the probe in or out. Once you have moved the probe to the center of the tube retighten all four (4) screws.
11. Sometimes you may need to have the four (4) shoulder screws holding the converter bracket as well as the four screws holding the converter all loose at the same time to get to the center of the tube.

12. Once you have aligned the ultrasonic probe to the center of the tube in position “17” in the carousel you need to index the carousel and check for alignment in all other positions. If you are properly aligned in position “17” you should be properly aligned in all other positions as well.

## Attaching the Probes

### Attaching the Ultrasonic Probe

- The ultrasonic probe is attached to the ultrasonic converter by screwing the probe to the bottom of the converter.
- Once the probe has been hand tightened to the bottom of the converter, use the two (2) wrenches provided in the tool kit to tighten further.
- Make sure that the wrenches are keyed into the flats on both the probe and the converter when tightening with the wrenches (*see Figure 2*).

**\*\*CAUTION MUST BE TAKEN WHEN TIGHTENING THE PROBE – BOTH WRENCHES MUST BE USED TO PREVENT DAMAGE TO THE CONVERTER.\*\***



**Figure 2.**

### Attaching the Mechanical Generator Probe

1. All PRO Scientific mechanical generators are attached to the brushless motor unit by inserting the upper end of the generator into the collar end of the motor.
2. Align the vertical slots in the generator with the locating pins in the motor collar by rotating the generator.
3. Once aligned, push the generator upward into the motor collar as far as possible and turn the generator counter-clockwise. The motor collar is spring loaded so you will feel some resistance as you push the generator upward and turn it.
4. Once you have turned the generator as far as it will go, release the generator and the generator will drop into its locked position (*see Figure3*)



**Figure 3.**

5. Once in position insert the safety clip, which is found in the tool kit, between the bottom of the motor collar and the knurled ring found at the top of the generator.

**\*\*THE SAFETY CLIP WILL PREVENT THE GENERATOR FROM ACCIDENTLY BEING REMOVED FROM THE MOTOR COLLAR. \*\***

6. To disconnect the generator from the motor unit, remove the safety clip, push the generator upward into the motor collar as far as it will go and turn the generator clockwise. The generator will be pushed out of the motor collar by the internal spring in the motor collar.

## Setting Up Samples in the Carousel Rack

### Special Setup Steps when Using Microtubes / Small Tubes

**\*\*WHEN USING THE MICROTUBE CAROUSEL TRAY, IT MAY NOT BE POSSIBLE TO VISUALLY SEE THE TUBE AND SAMPLE HEIGHT TO PROPERLY SET UP THE HOMOGENIZING DEPTH AND HOMOGENIZING SPIN-OFF HEIGHTS. THEREFORE IT IS IMPORTANT TO TAKE THE FOLLOWING PRE-STEPS BEFORE CREATING A PROGRAM.\*\***

#### *Setting Sample Homogenizing Depth and Spin-off Height*

1. Fill a tube with the appropriate amount of sample and liquid medium.
2. Do not place the tube in the DHS-220 carousel rack
3. While holding the appropriate generator probe (mechanical and/or ultrasonic), place the generator probe 1/3 of the sample height off from the bottom of the container.
4. Mark this height on the generator probe shaft. This is your homogenizing depth.
5. See figure 4.



Figure 4

**\*\*WHEN SETTING DEPTHS FOR THE ULTRASONIC HOMOGENIZER, MAKE SURE THAT THE PROBE NEVER TOUCHES THE SAMPLE TUBE OR RINSE TUBE.\*\***

6. Lift the appropriate generator probe (mechanical and/or ultrasonic) just above the sample line. Make sure you are still within the tube.
7. Mark this height on the generator probe shaft.
8. This is your spin-off height.
9. See figure 5.



Figure 5

10. Now you have a visual marker(s) on the generator probe(s) while completing the program setup

#### **Microtube Cap Placement**

1. The caps of the microtubes need to be pushed either to the left or right to make them flush against the carousel.
2. Push all caps the same direction (left or right).
3. See Figures 6A, 6B and 6C.



Figure 6A



Figure 6B



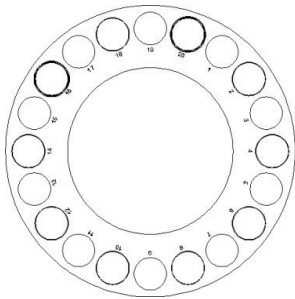
Figure 6C

#### **Setting up Carousel for Rinse Position(s)**

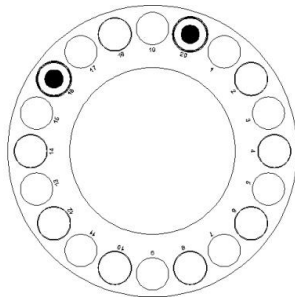
- When running in the manual mode, samples and rinses can be placed in any position in the carousel rack that you might like.
- When running in the program mode, it is important that special care is taken as to the placement of your samples in the carousel rack.
- Each carousel rack will hold 20 test tubes.
  - These tubes can hold a sample or they can be designated as a rinse tube.
- Looking at the top of the carousel tube rack you will notice that each position in the carousel rack is numbered from 1 to 20.

- You will also notice that all even number positions are marked with a ring around the hole and the odd number positions have no markings around them.
  - Special attention must be taken to position 16 and position 20 in that they have a double ring around the hole.
  - The positions with a ring around the hole are positions that are to be used when rinses are required.
- Running in the program mode allows you to have no rinse tubes, two (2) rinse tubes, or ten (10) rinse tubes. (see Figure 7)

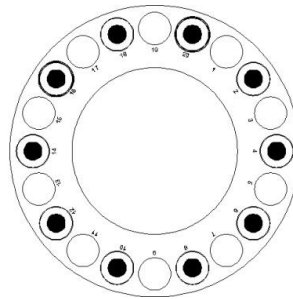
No Rinses



Two Rinses



Ten Rinses

**Figure 7. Orientation of Rinse Tubes in Carousel Tube Rack**

### **No Rinse Tubes**

- If twenty (20) samples are to be run without any rinsing between samples you would load the carousel rack using all twenty (20) positions.
- If you were to run any number of samples less than twenty (20), you need to load the carousel rack beginning with position 1 then position 2 etc.
- Place the loaded carousel rack into the DHS-220. There are two (2) holes in the bottom of the carousel tube rack which align with two (2) pins located in the top of the turntable.

### **Two (2) Rinse Tubes – “Stationary Rinse Bath”**

- A two (2) position rinse is referred to as a “Stationary Rinse Bath”.
- The maximum number of samples that you can run using two (2) rinse tubes is eighteen (18).
- If running eighteen samples and two (2) rinse tubes, the tubes must be placed as follows:
  - Rinse tubes (2) must be placed in position 16 and position 20.
  - Position 16 and position 20 are marked with a double ring around the hole designating that position as a rinse position.
  - Samples will be placed in all the remaining positions.
- If running any number less than eighteen (18) samples the tubes must be placed as follows:
  - Rinse tubes (2) must be placed in position 16 and position 20.
  - Samples must be placed in the remaining open positions beginning with position 1 and then position 2 etc.
  - Stay in numerical order when loading the carousel tube rack skipping placement of your sample in positions 16 and 20 which are rinse positions.

- Place the loaded carousel rack into the DHS-220. There are two (2) holes in the bottom of the carousel tube rack which align with two (2) pins located in the top of the turntable.

### *Ten (10) Rinse Tubes – “Multi Rinse Baths”*

- A ten (10) position rinse is referred to as a “Multi Rinse Baths”
- The maximum number of samples that you can run using ten (10) rinse tubes is ten (10).
- Samples must be placed in the odd number positions 1, 3, 5, 7, 9, 11, 13, 15, 17, and 19.
- Rinse tubes must be placed in the even positions 2, 4, 6, 8, 10, 12, 14, 16, 18, and 20.
  - Notice that the rinse positions, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, are marked with a ring around the hole designating that position as a rinse position.
- If any number less than ten (10) samples is run, samples and rinses must be loaded starting with positions 1.
- Place the loaded carousel rack into the DHS-220. There are two (2) holes in the bottom of the carousel tube rack which align with two (2) pins located in the top of the turntable.

**\*\*IF USING A COOLING MEDIA WITHIN THE CAROUSEL CAUTION MUST BE TAKEN TO AVOID SPILLING ANY COOLING MEDIA INSIDE THE DHS-220 CABINET WHILE LOADING OR UNLOADING THE CAROUSEL\*\***

## System Front Panel

The DHS-220 is completely programmed and controlled by the operator using the “System Front Panel”.

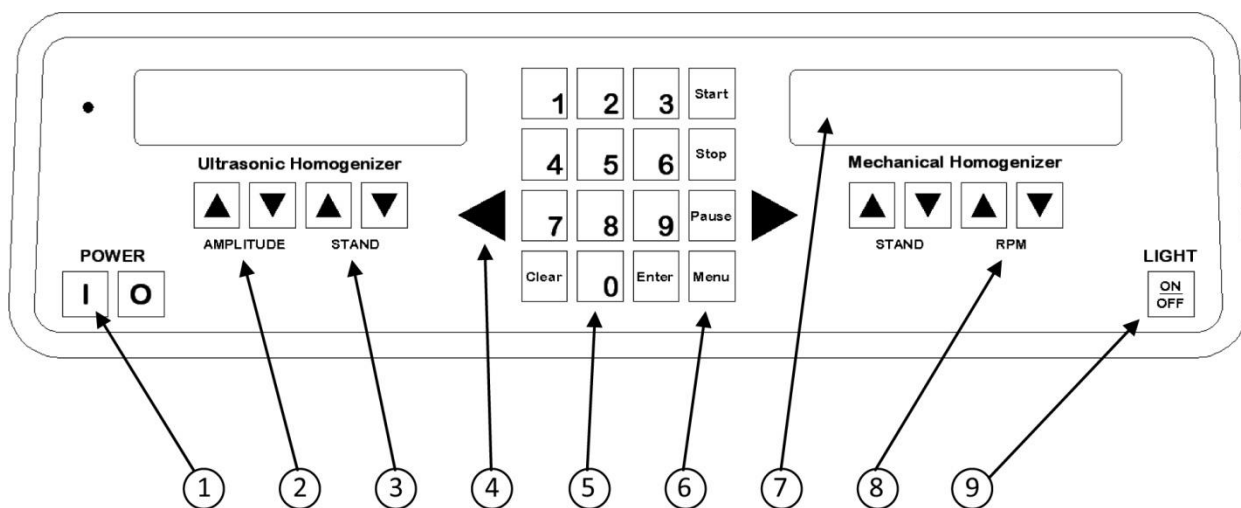


Figure 8. System Front Panel

1. Easy ON/OFF accessibility
2. Digitally manage amplitude (Ultrasonic)
3. Independent digital stand UP/DOWN controls
4. Cycle through samples without having to open the cabinet door
5. Ergonomic numeric keypad

6. Complete in-process control: START/STOP/PAUSE
7. Dual displays make for simple programming and information readout during processing
8. Digitally manage RPM (Mechanical)
9. LED light illuminates cabinet interior

**You are now ready to review the manual and create your program or run in manual mode(s).**

**PLEASE REFER TO THE DHS-220 OPERATING AND SERVICE MANUAL FOR ADDITIONAL PROGRAMMING GUIDANCE**

## **DHS-220 Re-Packaging Directions**

Here are the instructions to set the heads on the foam pad for storage or shipping;

- 1) Remove the probe and generator from their respective motor units
- 2) Turn the unit on
- 3) Set the foam block on top of turn table and under mechanical and ultrasonic heads
- 4) Press "2" for program
- 5) Assign # 1 Enter
- 6) Assign # of cycles 1 Enter
- 7) Assign Bath – NO, Press 2
- 8) Mechanical RPM , just press enter
- 9) Mechanical time, just press enter
- 10) Mechanical up/down, just press enter
- 11) Spin depth – lower mechanical head to foam pad, ENTER
- 12) Amplitude – just press enter
- 13) Time - just press enter
- 14) Ultrasonic up/down - just press enter
- 15) Spin depth – lower ultrasonic head to foam pad, DO NOT PRESS ENTER!!!!
- 16) Turn main power off