BPI Turbo Gradient 4™

For use only by qualified personnel in a laboratory environment.

Due to high operating temperature, access should be restricted.

BPI Turbo Gradient 4™

Specifications

The BPI Turbo Gradient 4™ uses microprocessor technology to make precision lens coloring easy. The operator can select from seven programs to create gradient and solid lenses as well as special effects. The gradient is controlled by the computer to create consistent results like never before possible.

The BPI Turbo Gradient 4™ also provides the fastest method available anywhere for producing solid tints. The constant motion of the lens in the dye solution helps keep pigments and/or coating solutions in suspension. The spinning action provided by the BPI Turbo Gradient 4 absolutely insures the absence of any gradient lines or white dots due to air bubble adhesion. The swirling action constantly brings fresh tint to the surface of the lens and the centrifugal action provides a concavity to the tint surface and to the gradient profile on the lens.

HEIGHT	WIDTH	LENGTH	VOLTAGE	WEIGHT	FUSE	AMPERAGE
23 in.	30 in.	11 in.	115 or 220 v.	30 lbs		5 amp
59 cm.	76 cm	28 cm		14 kg	20 Amp circuit breaker.	

THE SET-UP KIT INCLUDES THE FOLLOWING PRODUCTS:

- Instruction manual
- Four grounding springs for temperature probes.
- Two support brackets.
- Four BPI Lens Holder for Turbo Gradient 4™.
- Four Turbo Gradient Heads with control wires.
- Four non skid foot covers.

Unpacking

When unpacking your gradient system, please check to ensure that no concealed damage occurred in transit. If such is noted, save the shipping carton and immediately notify the shipping company's damage control inspector in your area so a claim may be processed. Failure to do this may void any future claim and replacement. Also, call BPI Customer Service so arrangements for a replacement may be made.

Setting Up

1. The BPI Turbo Tinter IV and the BPI Turbo Gradient 4 must be set up on a level surface convenient to an appropriate source of electrical power.
2. Place the non-skid covers on the four feet of the unit.
3. Ensure that the units are electrically grounded together by screwing the gradient to the tinter at its suppor t bracket.
4. Bond the tinter's temperature probe covers to the probe bodies. The grounding springs are slipped over the probe cover up to the point where part of the spring is on the cover and par t on the probe body.
5. The turbo heads must be attached to their suppor t arms. First insert the control wire into the back of each head, then attach to the arm with two screws and lock nuts . The other end of the control wire goes to its recepticle at the rear of the unit.
6. Position the BPI Turbo Gradient 4 behind the BPI Turbo Tinter IV and then slide it forward until it contacts the tinter.

Using The Gradient

The BPI Turbo Gradient 4 may now be connected to its power source and the circuit breaker switch located at the rear of the unit next to the power cord and Reset button may be turned on. The display will light and if any of the heads were down they will move upward to their Home position. The Gradient Running light for each running head will flash.

To make any changes you must use the push-button "Adjust" knob. Turn the knob until the cursor is next to the function that you want to change, then push the knob in to select that function. Again, turn the knob to make the change. When you are satisfied with the new value for the function, push the knob in to save the new value and retur n to the previous screen.

While on the main(initial) screen, continuing to turn the knob will take you to the screens for the individual heads,or you may use the push-button "Adjust" knob to select from the main screen which tank/gradient head you wish to program. A screen will come up for that head. Select the gradient "Program" to be used. See the list of programs below. Enter the vertical "Size" of the lens being tinted. Remember that what is to be the darkest por tion of the lens wants to be "down" when placed into the lens holder.

Enter the "Time" desired for the program to run. Enter "minutes" then go to the "seconds" area to change seconds. The exact running time for the program may differ slightly from your selected time, either due to a default minimum time for that program/size or due to necessity for cycle completion in a cyclic program such as program 4. Times up to 99:00 minutes may be entered.

When calculating size, you may want to enter a size smaller than the lens (in mm) if you want to leave part of the lens completely untinted. If you want more tint in the lightest part of the gradients, use a size value greater than the the ver tical size of the lens. The "spin" programs are "0" (no spin), "1" (continuous unidirectional spin) and "2" (interrupted spin with possible direction change). The spinning programs provide a more uniform gradient with a slight meniscus. They also discourage bubble adhesion to the lens surface (especially spin program "2").

"Depth" may be adjusted to position the lens in the lens holder just above the level of the tint; or use "Auto" and the lens holder will automatically lower the lens down to the tint and start the program - after you press "star t".

The programs may all be different for each tank/gradient head if you wish.

Attach the special (conductive) Turbo Gradient lens holder with lenses in place to the gradient head by holding the lens holder vertical and sliding it down and back into the rotor . Select that tank and press "Start". The head will lower the lens holder down to the tinting solution and then begin the gradient. The program may be stopped at any time by selecting the tank and then pressing "Start". The lens holder will be removed from the tint bath immediately.

Some programs run slowly, especially with small sizes and long times, but the emergency knob on the top of the gradient can be obser ved to see if the program is running. That knob may also be used to free up a "stuck" head. The head's red light also flashes when its computer program is running.

As the program runs, an occasional "hiccup" may be heard in the otherwise smooth operation of the gradient. This has two causes. One is the occasional addition of an extra step to compensate for water evaporation from the beaker during the gradient. The other cause is an interaction ("beat") between the gradient's current controller circuitry frequency and the gradient's natural stepping frequency. These have no effect on the gradient produced.

Programs

Program 0: *Solid*. In this program, the operator enters the amount of time for the lens to be immersed in the dye. The computer dips the lens into the solution at high speed and then agitates it up and down by a few millimeters so that the fluid touching the lens is always at full strength. This is the fastest procedure available for dyeing a lens a solid color. There is no minimum cycle time, since the lens bobs up and down until the requested time expires.

Program 1: *Parabolic*. This program produces a lens in which the characteristic time-distance curve is parabolic. In general, a parabolic program cycle produces a higher contrast gradient than a linear cycle, but not so much as the cubic cycle described below. Minimum execution time for this program is about 48 seconds.

Program 2: *Parabolic - Lower Light*. This program has the same general features as number 1 but differs in that the lens dips more quickly at the end of the cycle, thus producing a smoother fade between the clear and colored part of the lens.

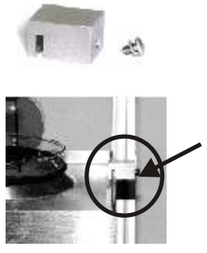
Program 3: *Cubic*. This program produces gradients whose time-distance cur ves are cubic in shape. It produces the most clearly visible gradients of any in this series and creates a subjective impression that the "turning point" between dark and light is nearer the dark side of the lens. In order to achieve the characteristic gradient, the motor will come to a complete stop from time to time. This is a nor mal part of the procedure.
Minimum execution time for this program is about 2 minutes, 45 seconds.

Program 4: *4-Stroke*. This program emulates a conventional 4-stroke (cam type) gradient. It has certain special features that make the appearance of a line (such as occurs in cam type gradients) less noticeable.

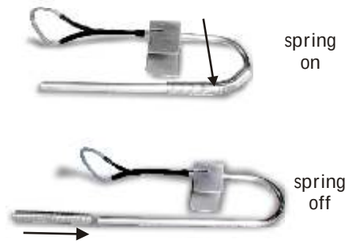
Program 5: Similar to programs 1 and 3 but suitable for longer timed gradients. Program starts more quickly and stops more gradually. It produces a uniformly dark top with less gradient at the bottom. There is a fast dip at the end to minimize line for mation.

Program 6: Similar to program 5 but less aggressive.

Turbo Gradient Lens Holder



Gradient Support Bracket



Grounding Springs

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