

OPERATION AND CARE MANUAL FOR ALLIGATOR TUMBLE STIRRER* VP 710T

*US Patent # 6,176,609

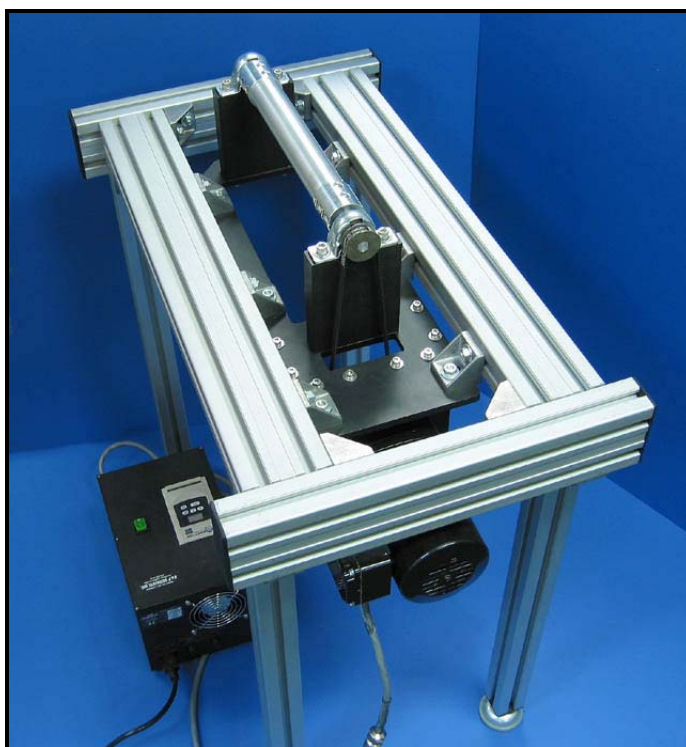


Figure 1. Alligator Tumble Stirrer VP 710T shown mounted to a profile table.

CAUTION!!!!!!

Be advised that the Alligator Tumble Stirrer has **VERY STRONG MAGNETIC FIELDS**.

- **People with pacemakers should not get closer than 18 inches.**
- **Remove all magnetic influenced tools and objects from the immediate area to prevent them from being pulled onto the magnet or from striking people as they are pulled onto the magnet.**
- **Keep credit cards, watches and other magnetic sensitive items at least 18 inches from the Tumble Stirrer's magnetic field.**

ASSEMBLY

Because of the way the tumble stir elements move inside a vessel there is a stronger stirring ability to the side of the magnetic cylinder that turns down (the right side of a magnetic cylinder that is spinning clockwise). Consequently, the center of the magnetic cylinder should be mounted 0.5" to the left of the center of the desired stirred area. [Note: The VP 710T is set at the factory to spin in a clockwise direction when observing the magnetic cylinder in the foreground and the motor in the background.]

The VP 710T mounting plate is attached by 6 angle brackets to standard Bosch aluminum extrusions used in profile tables (not included). When attached to a profile table, movement in the X axis is achieved by repositioning the two Y-axis struts (see Figure 1). This method allows for adjustment of the mounting plate in the Y and Z axis. When mounting to another structure, such as a robot system, use the 6 angle brackets to attach the VP 710T (see Figure 2). The t-shaped slots in the brackets allow for adjustments to the alignment of the Tumble Stirrer with the robot's deck.

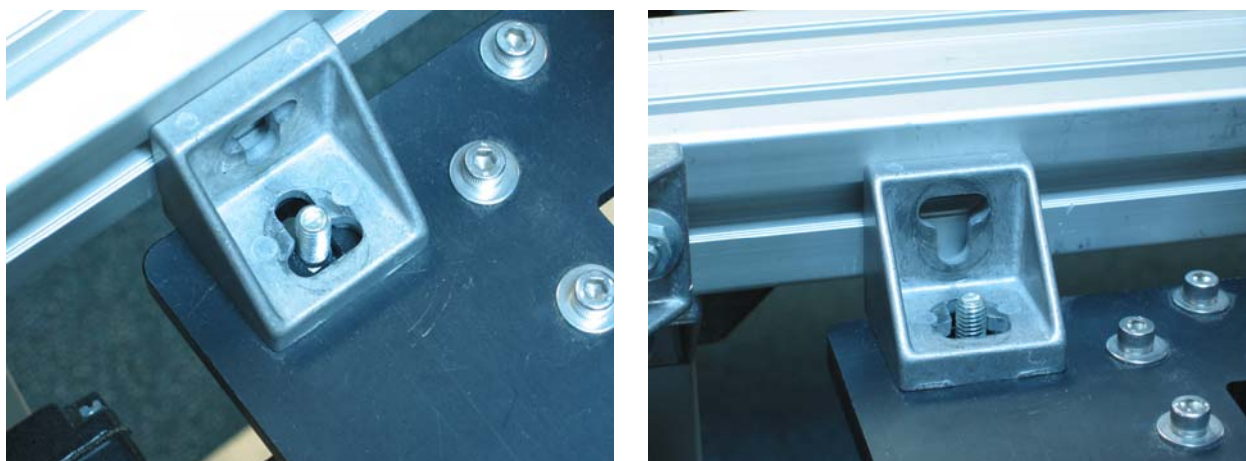


Figure 2. Adjustable angle brackets for mounting VP 710T to profile table or other structure.

OPERATING THE CONTROL

The PACESETTER™ “NANO” inverter is factory-set for operation using the push button keypad. Use the following procedure to start the motor and adjust speed.

1. Turn the AC power ON. The LED display will illuminate and show the current setting for output frequency. The power light just to the left of the LED display will also illuminate.
2. Press the button labeled RUN/STOP. The display will change to show actual output frequency, which will start at “000” and ramp up to the set frequency. Simultaneously, the motor will start and accelerate.
3. Press the button labeled “▲” to increase the output frequency. The motor will accelerate until the “▲” button is released. Note that the output frequency changes at a progressively faster rate the longer you hold the button down. Press the “▼” button to decrease the output frequency.
4. Press the button labeled RUN/STOP again to stop the motor.
5. If the motor does not start promptly and run smoothly, refer to TROUBLESHOOTING in the Appendix.

OPERATING THE STIRRER

The operating speed of the Tumble Stirrers is dependent upon the particular application to be used and needs to be empirically determined. The optimal speed is quite simple to determine. The Bodine AC Inverter Motor is controlled by changing the Hertz frequency: the higher the Hertz frequency, the faster the speed. The table below converts the Hertz frequency in the digital read out to speed in RPM.

**RPM/Hertz Conversion Table
VP 710T**

RPM	Hz
0	0.0
20	1.4
40	2.8
60	4.3
80	5.7
100	7.1
150	10.6
200	14.2
250	17.7
300	21.3
400	28.4
500	35.5
600	42.6
700	49.6
800	56.7
900	63.8
1000	70.9
1100	78.0
1200	85.1

The motor is set at the factory to deliver a top speed of 1200 RPM which corresponds to a frequency setting on the control of 85. The correlation between frequency and RPM is 1 to 14.1 so just multiply your frequency on the control by 14.1 to determine the RPM. Although it is possible to set the Hertz frequency higher, neither V&P nor Bodine recommends operating at the higher settings for long periods of time or under heavy loads. Also note that at low Hertz frequency settings the stirrer may not operate. In this case the frequency must first be set high enough to overcome inertia.

Factors to consider in determining optimal stir speed are the fragility of the objects being stirred, size, shape, composition of the test tube, vial, bottle or well (polypropylene or polystyrene), depth of the microplate wells, volume and viscosity of the liquid, and the type of stir disc or bar used.

In general, stirring microbial cultures works best at low speeds. Stirring to re-solubilize extracts or to stir in deep well microplates, or to resuspend beads with the Bubble Paddle Reservoirs requires high speeds. Again, the speed of stirring needs to be determined empirically for the particular application.

CARE

When not in use, turn the power switch off. Do not place the control unit in chambers with temperatures above 40°C. The Tumble Stirrer motor is an AC Inverter motor and requires no maintenance. Extra fuses have been provided in the rare event that they blow.

If technical assistance is required, contact:

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WARRANTY

There is a one-year warranty against defective parts. We will replace or repair the defective part and not charge a Labor fee. Damage to the machine caused by user negligence is not covered. We ask that you keep the special shipping carton in case you need to send the unit back to us.

SPECIFICATIONS AND SAFETY PRECAUTIONS

The VP 710 series Alligator Tumble Stirrers are driven by a heavy duty three phase, inverter duty, non-synchronous, parallel shaft, 1/6 horsepower, induction gearmotor, manufactured by Bodine Electric Company. This motor was selected primarily because of its ruggedness and reliability. The control for this motor is a Bodine adjustable speed drive - PACESETTER™ “NANO”. It is a PWM type inverter that accepts single-phase AC input voltage and converts it to an adjustable frequency three phase AC output voltage. Since the speed of AC induction motors is proportional to the line frequency, adjusting the output frequency of the inverter enables adjustable speed operation of the motor. At output frequencies below the motor's rating, the PACESETTER™ “NANO” series inverter simultaneously adjusts applied voltage to the motor so that it is proportional to the applied frequency. This prevents stator saturation and the resultant overheating. At output frequencies above the motor rating, the applied voltage is held constant, so torque output from the motor is proportionately lower at higher frequencies. If the equipment is used in a manner not specified by V&P SCIENTIFIC, INC., the protection provided by the equipment may be impaired.

SPECIFICATIONS

NANO Inverter Specifications

Input Voltage:	110 to 120 VAC +10%/-15%, 50/60 Hz +/-5%, Single Phase
Maximum Output Voltage:	200 to 240 VAC +10%/-15%, Three Phase
Output Frequency:	0 to 120 Hz
Ambient Operating Temperature:	-10°C to 40°C
Humidity:	0 to 95% Noncondensing
Vibration:	<1G (9.8 m/s ²)
Enclosure rating:	IP 20
Safety Approval:	UL Listed
Dimensions, Width X Height X Depth:	2.83" x 5.20" x 4.64" (72mm x 132mm x 118mm)
Weight:	
Model 2701:	1.7 lb

Additional Tumble Stirrer Specifications

Equipment Rating	230V~, 1.6A, 50/60 Hz
Ambient Environment:	Indoor use, Altitude up to 2000 m, supply voltage not to exceed √ 10% of nominal, Installation Category II and Pollution Degree 2.
Safety Approval:	UL Listed

SAFETY PRECAUTIONS

The use of motor controls, like that of all utilization of concentrated power, is potentially hazardous. The degree of hazard can be greatly reduced by proper design, selection, installation, and use, but all hazards cannot be completely eliminated.

The following safety precautions must be observed during all phases of installation, operation, service, and repair of this motor control product. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture and intended use of the products. V&P Scientific assumes no liability for the customer's failure to comply with safety requirements and practices.

Throughout this manual, and the NANO Operators Users Manual (see Appendix), a WARNING will highlight a procedure, which presents potential danger to people, and a CAUTION will highlight a possible danger to equipment. Both types of instructions must always be followed.

WARNING

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| <ul style="list-style-type: none">• Do not touch the PCB or components on the PCB right after turning off the power. Wait until the power indicator turns off or at least seven minutes.• Do not attempt to wire circuitry while power is on. Do not attempt to examine the components and signals on the PCB with the inverter operating.• Do not attempt to disassemble or modify internal circuitry, wiring, or components of the inverter.• The grounding terminal of the inverter must be grounded properly with 200V class type III standard. |
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CAUTION

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| <ul style="list-style-type: none">• Do not attempt a dielectric strength test to internal components of the inverter. They are sensitive semiconductor-devices vulnerable to high voltages.• Do not connect the output terminals T1(U), T2(V), and T3(W) to an AC power outlet.• The CMOS IC on the primary PCB of the inverter is vulnerable to static electrical charges. Avoid contact with the primary PCB of the inverter. |
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WARNING

To avoid personnel injury caused by electrical shock, do not remove the cover of the inverter when the power is ON.

CAUTION

Do not disconnect motor during operation. Otherwise, inverter over-current breakdown may result.
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FOOTNOTE

The above operating instructions apply to operating the Alligator Tumble Stirrer unit in the “Basic” mode. For information on connecting the NANO control to external devices or on changing the programmable functions of the NANO, refer to “Advanced Installation & Operation” in Appendix

APPENDIX

Instructions for Installation and Operation of PACESETTER Adjustable Speed Drive