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WAVE MECHANIC POWER SUPPLY

Why a power supply? But first, why an AC turntable motor?

Nottingham Analogue turntables excel by virtue of their almost elemental simplicity, relying as they do on the fact that a rotating platter will continue to do so at absolutely constant speed unless acted upon by outside forces. By coupling this steadily rotating mass to an arm base that is stable around the axis of rotation of the platter, the result is a truly integrated unit.

By giving the platter adequate moment of inertia, the effects of any variability in outside forces are minimized. However, the most important force, bearing friction, should if the bearing is correctly made and lubricated remain essentially constant; hence, all that is required is to supply a small amount of energy to the platter at a constant rate – just sufficient to counter the friction and maintain a steady speed.

DC motors and their highly developed control systems may rightly dominate the small motor market for "movement and placement" applications such as robotics, but are they what we need in order to maintain this steady state? For this purpose, an AC synchronous motor backed by the "mass" of the National Grid should be the answer. Unfortunately, although the laws of mechanics show no sign of changing, electricity supplies are – and apparently always for the worse. There are four main areas of concern.

1. **Voltage variations**

As a case in point, since "harmonizing" with the rest of the EC, the nominal UK domestic supply voltage has fallen from 240V to 230V, but the permissible range of voltage has increased vastly, now being from –6% (216.2V) to +10% (253V). This whole range will not be seen in any one locality, but wide variations do occur between different areas.

For an AC synchronous motor, such voltage variations will not affect its overall speed, but will affect its torque: not what we need for constant energy input (torque x speed = power). In addition, the absolute voltage level has a very distinct effect on the dynamics and detail of the music, with a clearly audible optimum voltage range. We need, then, to be able to optimize the motor supply voltage and to hold it stable.

2. **Frequency variations**

These, by definition, will directly affect the speed of a synchronous motor. Supply frequency variations are generally slow, but are easily demonstrated using an independent precision strobe illuminator such as the "Zapper".

Permissible variation in the UK is +/- 1% (6% equates to a semitone). Over 24 hours the frequency must average exactly 50Hz to satisfy users of synchronous clocks, so that if the frequency is slow at one point in the 24 hours, it must be fast at some other point as night follows day (sometimes literally!). For a power supply, some slight adjustment of frequency is desirable for pitch purposes but once set, it must remain stable.

3. Supply waveform

This is an aspect that has been becoming universally and insidiously more of a problem over the years largely as a result of the “switched mode” power supplies that have generally supplanted transformers in much modern electronic equipment.

The supply waveform does not now have a clean sinusoidal shape, but shows drastically clipped peaks – the equivalent of adding numerous high order harmonics to the fundamental 50 or 60 Hz. These can be shown to exist at significant levels far up into the audio frequency range, and even if attenuated by damping in the drive belt will still feed through to the platter. We need to synthesize a new clean waveform; “filtering” is not an answer.

4. Voltage spikes, and other “hash”

These are another part of the fallout from the volume and complexity of modern consumer demands, and are sufficiently worrying to have provoked restrictive regulations on equipment manufacturers. Our AC motor supply needs to be free of all such intrusions.

THE WAVE MECHANIC

The “Wave Mechanic” power supply addresses all of these issues, and provides a clean waveform, stable in voltage and frequency even when run off voltages well below the permissible level. The output voltage is pre-set internally to be in the optimum range, and there is a single control on the front panel to allow minor adjustment of the frequency for pitch control. Other than for this purpose it will probably remain untouched.

Both 50Hz and 60Hz version are available configured to suit local frequency and voltage.

For a Turntable speed reference to partner the “Wave Mechanic” power supply, the “Zapper” hand-held battery-operated strobe illuminator is ideal. This is available in 50Hz and 60Hz version, either with the power supply or separately for more general use.

The audible benefits of the power supply are very clear. Detail, dynamics and sound stage are all much improved, but perhaps the most evident feature is the way that the whole pace and rhythm of the music sound natural and true. Pitch stability is impeccable, giving complete confidence and much deeper involvement in the musical performance.

The benefits should not be expected to replace those from upgrading the turntable, but rather to complement them. Al of the Nottingham Analogue turntables will benefit, whether your current one or your next upgraded one!

Specifications:

Supply voltage/frequency: Version for 230V/50Hz, 115V/60Hz, 100V/50Hz, 100V60Hz

Power consumption: 6.5W

Fuse: Ceramic HRC 5mm x 20mm T250mA (230V), T500mA (115V and 100V)

Output frequency: 50Hz or 60Hz (depending on model) with control in center position.

Case Dimensions: (H x W x D) 2.55” x 4.13” x 11.22”

Weight: (w/ packaging) 5.6 lbs.