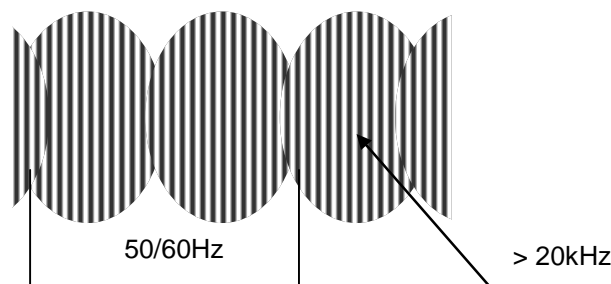


### High Frequency Electronic Lighting Ballasts Why The PM3000A is The Best Solution

#### Signal Synchronisation

The waveforms at the output of an electronic ballast consist of a high frequency signal modulated by the line frequency of 50 or 60Hz.



Any precision power analyser must be synchronised to the correct fundamental frequency in order to measure Volts, Amps, Watts and Harmonics correctly.

For the ballast waveform as shown above this means that an analyser must be synchronised to, and make measurements over, the complete 50 or 60Hz cycle.

Without the use of special techniques, many analysers will synchronise to the high frequency (>20kHz) signal and produce inaccurate results based on analysis of incomplete periods of the 50/60Hz waveform. A symptom of this is that the results displayed will be varying and unstable.

The 'Ballast Mode' on the PM3000A ensures that complete cycles are measured and a very fast sampling rate means that none of the data contained in the high frequency signal is lost.

#### Accuracy over Range of Current.

BEWARE analysers that use current transformers with high current ratings when measuring small currents. The accuracy of ANY current transformer (including hall-effect) is severely limited when measuring at less than 10% of full scale.

For example, 200mA measured using a 20A CT (1% of range) will often mean very very large errors - sometimes even no measurement at all!. Ask for the complete specification of an analyser at the typical currents and frequency you intend to measure, and where possible make measurements to confirm this.

The PM3000A achieves its full specification (0.05% basic) over the range 20mA to 30A RMS. (5mA upwards using the *Ballast CT*).

## Flexibility

Current transformers are often used when making ballast output measurements because they reduce the number of connections required and provide measurements of tube power. Inaccuracies often result in conventional transformers (as used by other analysers) because:

1. The CT has too high a rating (see above)
2. Precision is only achieved when the wire is at the exact centre of the CT opening
3. Amplitude and phase errors are introduced at high frequencies

Voltech overcomes all of these problems by producing the '**Ballast CT**'. This dedicated precision CT:

- 1 Has two ranges, 5mA to 100mA, and 50mA to 1A.
- 2 Is tri-filar wound. - No positional error
- 3 Fully specified accuracy to 500kHz.

## Sophisticated PC Software

Voltech 'VPAS', a 'Windows' based software package, includes support for the PM3000A 'Ballast Mode'. This easy to use software allows quick setting up of the analyser and results export to standard word-processing and spreadsheet software.

## Obtaining the Best Solution

To find out why companies like Osram-Sylvania, Philips Lighting and Motorola Lighting rely on the PM3000A for accurate measurements on high frequency lighting ballasts, please contact your local distributor.

**FREE** publications available from the world leaders in power measurement include:

- 'Measurements in Lighting Applications' - a 56 page applications handbook.
- 'Ballast CT' brochure.
- PM3000A Brochure
- VPAS Brochure and **demonstration disk**.

And on other power measurement topics:

- 'PWM Drives. Measurements in motor applications' - 66 page handbook
- 'Testing to IEC555 Harmonics and Flicker' - 104 page handbook