

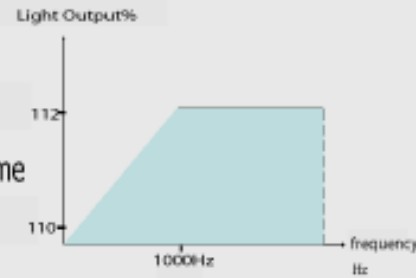
BENEFITS OF ECONOWATD



There are many reasons why people use ECONO-WATD. Here are some of the benefits.

INCREASED LIGHT OUTPUT

When the operating frequency is increased from 50 Hz to above the audible limit of 20kHz, fluorescent lamps can produce around 10% more light for same input power. Alternatively, the input power can be reduced for the same light output.



FLICKER ELIMINATED



A fluorescent lamp operating at 50/60Hz will extinguish twice every cycle as the mains sinewave passes through zero. This produces 100/120Hz flicker which is noticeable or irritating to some people. It will also produce the well-known and potentially dangerous stroboscopic effects on rotating machinery. If the lamp is operated at high frequency, however, its light output is continuous. This is because the time constant, hence the response time of the discharges is too slow for the lamp to have a chance to extinguish during each cycle. The output waveform of an electronic ballast will usually be slightly modulated by 100/120Hz "ripple". Provided this is kept to a reasonable level by filtering within the ballast, the drawback associated with 100/120Hz flicker are eliminated.

AUDIBLE NOISE ELIMINATED

Since electronic ballasts operate above the audible range, they do not suffer from the audible noise problems that can occur with mains frequency choke ballasts. This is caused by mechanical vibrations in its laminated steel body of the lighting fixture and the surface to which it is fixed, which amplifies the original noise even further.

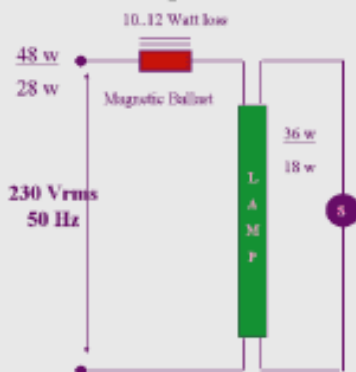
LOWER TOTAL CIRCUIT POWER

An electronic ballast will consume less power and therefore dissipate less heat than a mains frequency magnetic ballast. Take as an example two 1200 mm 36W energy-saving lamps operated on standard 50Hz switchstart control gear. The power consists of 2x36W for the lamps and 2x12W for the ballasts, giving a total power of 96W, or a power per lamp of 48W. The same light output can be obtained from a single electronic ballast driving the lamps at 32W each. The total ballast power dissipation is 6W, giving a total power of only 70W, or an equivalent power per lamp of 35W. These power reductions are possible because:

- (a) At high frequency, the lamp can be run at a lower power for the same light output.
- (b) The power loss in an electronic ballast is much lower than the power loss in mains frequency magnetic ballasts.

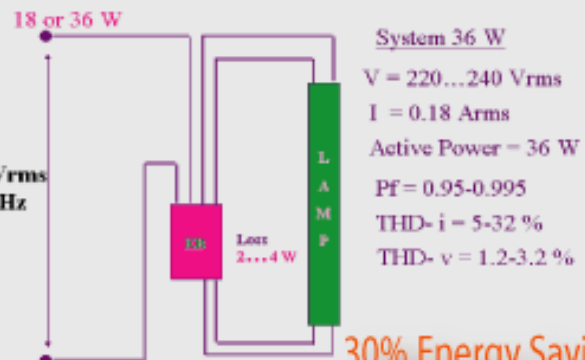
From the example given it can be seen that it is possible for the total circuit power dissipation -i.e. lamp plus ballast- to be lower than the rate power of the lamp alone (35W compared with 36W). Energy cost reductions of 20-30% are achievable.

Magnetic Ballast + Cap System



Lamp 36 W
 $V = 220...240$ Vrms
 $I = 0.26$ Arms
 Active Power = 48 W
 $Pf = 0.85$
 $THD-i = 23-60\%$
 $THD-v = 1.2-3.2\%$

Electronic Ballast System



30% Energy Saving

System 36 W
 $V = 220...240$ Vrms
 $I = 0.18$ Arms
 Active Power = 36 W
 $Pf = 0.95-0.995$
 $THD-i = 5-32\%$
 $THD-v = 1.2-3.2\%$