

## Modular Rectifier Vs. Single Transformer Efficiency

What kind of savings would I have using a single transformer rectifier versus a multi-transformer (modular) one? (For this example, we will use a 400 volt / 1,000 ampere rated rectifier).

Regardless of output operating levels, the difference in comparison between systems operating at the same levels would be roughly the same.

Single transformer is up to 91% efficient

Modular Rectifier is 86% efficient

The Difference is 4% with the single transformer unit being more efficient.

|                           |                   |
|---------------------------|-------------------|
| Cost per kW hour          | .08 cents         |
| Hours of operation        | 8 hours per day   |
| Days of operation         | 5 days per week   |
| Weeks of operation        | 50 weeks per year |
| Annual hours of operation | 2,000 hours       |

Cost of operation is  $\boxed{\text{kW} \times \text{Hours used} \times \text{Cost per kW hour}}$

First find Power Input  $P_{In} = \frac{P_{Out}}{\% \text{ Eff}} \times 100$

$$\text{So....} \quad 439,560 = \frac{400 \times 1000}{91} \times 100$$

**Cost of operation is 439.6 x 2,000 x .08 = \$ 70,336 / year for the Single transformer system**

$$\text{So....} \quad 465,116 = \frac{400 \times 1000}{86} \times 100$$

**Cost of operation is 465.1 x 2,000 x .08 = \$ 74,416 / year for the Modular transformer system**

**A savings of \$4,080 per year would be achieved by using the single transformer system.**

You may substitute different operating currents if you are operating at 100% of the Rectifier output voltage rating, or are re-tapped close to the actual operating voltage. If you are operating at voltage levels lower than the full rectifier rating, a lower Power Factor will result. This will affect the efficiency value.

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