Energy Savings Estimator
for Centrifigual Fans & Pumps

Calculate the Benefits!

Compare Variable Frequency Drive (VFD) performance to other methods of volume control (based on motor output or shaft horsepower).

Here's how to make this quick and simple analysis.

Step 1. Convert motor HP to kW:

_____HP x .746 = _____ kW_1

Step 2. Multiply the Variable Frequency Drive Power Ratio (from Table below) times kW_1 from Step 1:

_____Ratio x _____kW_1 = _____ kW_2 (using VFD)

Step 3. Multiply the power ratio of the control method now being used (see table below) times kW_1 from Step 1:

_____ Ratio x _____ kW_1 = _____ kW_3 (method now being used)

Step 4. Subtract Step2 kW_2 from Step 3 kW_3:

_____ kW_3 minus _____ kW_2 = _____ kW_4 (savings using VFD)

Step 5. Multiply Step 4 kW_4 savings times hours per year of operation times cost per kWHr of electricity:

_____ kW_4 x _____ Hrs x \$_____/kWHr = \$_____
(Annual savings using VFD **)

Example: A 60HP fan motor is now operating 24 Hrs per day (or 8760 Hrs per year) riding the fan curve for variable volume control and the local utility charges \$0.12 per kWHr:

Step 1. <u>60 HP</u> x <u>.746</u> = <u>44.76</u> kW_1

Step 2. <u>.32</u> Ratio x <u>44.76</u> kW_1 = <u>14.32</u> kW_2

Step 3. <u>.94</u> Ratio x <u>44.76</u> kW_1 = <u>42.07</u> kW_3

Step 4. <u>42.07</u> kW_3 - <u>14.32</u> kW_2 = <u>27.75</u> kW_4

Step 5. <u>27.75</u> kW_4 x <u>8760</u> hrs x <u>\$0.12</u>/kWHr = **<u>\$29,170</u>**
Annual savings!

Fans at 60% of maximum flow*		Pumps at 70% of maximum flow*	
Ratio	Flow control method	Ratio	Flow control method
0.32	Variable Frequency Drive	0.41	Variable Frequency Drive
0.69	Inlet Guide Vane	0.83	Discharge Valve
0.94	Discharge Damper	1.00	Bypass Valve
0.94	Ride the Fan Curve	1.00	No Control
1.00	Bypass Damper		

* The Power Ratio Data is a conservative assumption based on HVAC applications which have shown that fans and pumps operate, on average, at 60% and 70% of maximum flow rate respectively.

** Remember, this result is only an estimate based on averages and assumptions. You should also consider additional savings to be gained from VFD application over and above the electricity rate, such as power factor improvement to.98 and reduced demand charges.