

## Successful Implementation – Energy Conservation Measure

<b>Measure</b>
Direct coupling of motor and refrigeration compressor to reduce transmission losses
<b>Equipment</b>
Compressors
<b>Industry / Sector</b>
Engineering
<b>Year of Implementation</b>
1998
<b>Cost Benefit Analysis</b>
o Type of Measure: Low investment
o Annual Energy Savings: 0.40 kWh
o Actual cost savings: Rs. 2.0 lakh
o Actual investment : Rs. 0.4 lakh
o Payback: 3 months
<b>Implementation Highlights</b>
<p>Implementation of the measure has resulted in</p> <ul style="list-style-type: none"> <li>☞ Low cost measure</li> <li>☞ This measure can be duplicated in any compressors, fans and blowers, provided both driver and driven equipment operates at the same speed.</li> <li>☞ Reduces the slip during the transmission</li> <li>☞ Also increases the output of the driven equipment</li> <li>☞ Reduces the inventory required such as pulleys, belts</li> <li>☞ Reduces the maintenance cost of the equipment</li> <li>☞ Easy to implement with out any external expertise</li> </ul>

### Summary

Application of direct coupling will reduce the transmission losses in any fans, blowers, compressors, if both driver and driven equipment operates at the same speed.

**Background**

A leading German engineering company has a production workfloor air-conditioned by 2x60 TR units. During the normal operation, depending upon the floor conditions one or both units are operated.

Each compressor was connected to the motor having rated capacity of 55 kW through V-belts. It was observed that both the pulleys of motor and refrigeration compressors are of same size.

The Power consumption in compressors unit was be reduced by direct coupling of the motor with the compressor unit.

While implementation of this measure the following were given attention:

☞ If the motor and compressor are directly coupled, the speed of the compressor will increase thereby increasing the power consumption because of elimination of slip and marginal variation in the sizes of pulleys. The power consumption in the unit can be reduced by matching the output, i.e., reduce the delivery pressure of the refrigerant since the speed of the compressor is increased.

☞ The rotation of compressor should be checked

Measured power consumption in compressor #1 : 56 kW

Measured power consumption in compressor #2 : 54 kW

Reduction in power consumption of compressor # 1: 2.9 kW

Reduction in power consumption of compressor # 2: 2.5 kW

Total power savings : 5.4 kW

**Principle**

Normally in any transmission, loss of power of 6-8% will exist to compensate the transmission losses. In direct coupling these transmission losses can be eliminated.

**Details of techno-economics:**

Particulars	Actual energy savings
Annual Total energy savings, lakh kWh	0.40
Annual Cost savings, Rs. lakh	2.00
Cost of Implementation, Rs. lakh	0.40
Simple payback period, Year	3 months

**Implementa  
tion issues**

- ☰ Require changes in the foundation
- ☰ Not in many cases both driver and driven equipment operate with the same speed
- ☰ While implementation attention to be given for the rotation of the driven equipment, output of the equipment. Since direct coupling will result in more operating speed of driven equipment thereby output of the same will be increased.