by Phil Sprague

Adjustable speed drives save energy in hotels

Hotels can realize considerable energy savings by employing an adjustable speed drive on mechanical motors that are utilized for a variety of applications in the lodging industry. Unfortunately, most hotel man-agers fail to realize this and their property continues to incur excessive energy bills. This article will discuss the various applications of adjustable speed drives and how your hotel might benefit from their use.

What is an adjustable speed drive?

An adjustable speed drive (ASD) is a small microprocessor computer about the size of a shoe box. The ASD, when mounted on an alternating current (AC) electric motor, converts the motor to a direct current (DC) motor. This allows the motor to be slowed down by as much as 80% of its rated speed, without any adverse effect on the motor. Additionally, the adjustable speed drive not only has the ability to slow a motor down, it also has the ability to schedule when these slower operating periods occur.

Typically, ASD's are used on electric AC motors five horsepower and greater. As you might expect, a large portion of alternating current motors in hotels used for fans and pumps are more than five horsepower. The cost of an adjustable speed drive may vary from $1,000 to $3,000, plus a couple hours of electrician's time to install it. The cost depends on the size of the motor it is controlling.

Application of ASD's in hotels

Almost all hotels of moderate size have multiple motors ranging from three horse-power to fifteen horsepower. Typical areas where these motors can be found are on air handling units and exhaust fans. As an example, it is not unusual to find a corridor supply fan which operates 24-hours a day and provides 100% fresh air to each floor of hotel corridors.

This example can provide an excellent opportunity for a cost effective application of an adjustable frequency drive. During late night hours, such as from 11:00pm to 6:00am, the corridors are seldom occupied. This can provide for an ideal opportunity to apply an adjustable speed drive on the motor serving the fan of the corridors. Assuming this fan has a five horsepower motor and it can be slowed down by 20% during late night hours, the actual savings will be in the range of 50% of normal motor electricity consumption. Under these circumstances, the adjustable speed drive will reduce consumption by about 50%. This can result in a savings in the range of $4,000 per year. Therefore, the simple payback on this type of application would be well under six months. Also, do not forget that utility companies will also provide about a 20% rebate on the initial cost of the adjustable speed drive, under any application.

Another good application example is in the indoor pool air handling unit. In this case, the adjustable speed drive will either speed up or slow down, depending on the humidity in the space. In larger hotels with large meeting rooms, adjustable speed drives are used on large fans to slow them down when occupancy in these spaces is low. In this case, the adjustable speed drive is controlled by the amount of carbon dioxide in the space, which indicates a level of occupancy.

For big hotels that have a large central air conditioning plant with a cooling tower, the adjustable speed drives can be connected to each of the fan motors in the cooling tower, thereby slowing the fan down as the temperature of the water in the cooling tower drops. This can be slightly more costly and provide a slightly longer return on investment.

Most new products on the market that have a good adjustable speed drive application are offered as an add alternate to the cooling tower or the air handling units as they are manufactured at the factory. This is an extremely cost effective investment, as the first cost will be even less.

Another enhanced feature of an adjustable speed drive is that it can be communicating with a central energy management system for even better control and monitoring. You will find that almost all new hotels under construction apply this concept. The latest application of an adjustable speed drive to be on the market is the use of a large kitchen exhaust fan and make-up

air fan. In this case, the adjustable speed drive measures opacity, or smoke in the duct work, to determine if cooking is going on in the kitchen cooking equipment. Many hotels that have 24-hour room service simply leave their kitchen exhaust and make-up air system on twenty-four hours a day. Under the circumstances associated with an adjustable speed drive, this fan can now be slowed down during late night periods when there is no cooking and save a considerable amount of energy on the fan system and a reduced amount of outside air into the hotel. Reduction in outside air to a hotel can save almost as much money as the motor savings with an adjustable speed drive.

Conclusion

If you think you may have a good application for an adjustable speed drive in your hotel, simply contact a local mechanical contractor for their advice and an estimate of installed cost. Typically, most manufacturers of adjustable speed drives will also provide you with a computerized calculation of annual energy savings. In general, the application of adjustable speed drives on hotel fans and pumps, etc., is considered a no brainer in the energy conservation business. ✧

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