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THE BEST SOLUTION
CK Reg. Number: 1997/063529/23

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ENERGY SAVING PHILOSOPHY

The most effective way to maximize potential energy saving, maintenance and downtime in any modern compressor plant today, is to run the compressed air system within the narrowest possible operating pressure band. The ideal condition is to ensure maximum energy saving and operating efficiency and can be accomplished through not varying the operating pressure by more than 0,3 bar.

This suggests that the compressors must supply exactly the right amount of air at the correct pressure level demanded by the system, not allowing the air pressure to deviate outside the preset pressure band.

This can be achieved in any compressor system today including yours, simply by controlling the compressor/s with a computer management system programmed for dynamic air compressor operation.

AN INNOVATIVE CONCEPT

This new concept may sound absurd and totally against the old school of thought which suggested that longer unloading cycles meant energy saving, good performance and economical operation.
Today with modern rotary type compressors this statement no longer holds true. Simply due to the fact that today all modern compressors are controlled by more sophisticated means.

Most modern compressors are today managed by on board micro processors managing operating modes far more accurately. This means that the compressors are capable of easily delivering closer to the actual plant demand than their old predecessors; who relied almost entirely on mechanical devices and were confined to operating within larger pressure bands of up to 2 to 3 bar.
Note. 1 bar of air pressure = 6% in energy costs

MODERN TECHNOLOGY

Modern compressors can be programmed with much more flexibility, via electronic signals received from pressure transducers, far more accurately and just as reliably as the old traditional instrumentation used. This all translates into cost savings, especially on energy the biggest cost factor (up to 80%) on air compressors, but also on maintenance, reliability and downtime.

The best way to achieve this objective is to operate the air reticulation system as a multiple installation of air compressors, preferably of dissimilar size.
Depending on available finance there are a number of ways to achieve this objective. For instance the Compressor plant may be purchased out rightly or be hired on Aircontract or the air may be acquired as a utility based on the amount of m^3/min used at a particular pressure and paid for as a monthly utility fee.

ENERGY SAVING SYSTEMS

By running a multiple installation of compressors of unlike size together, while controlling them with a (Industrial computer) management system, the prescribed condition of 0.3 bar pressure band can easily be obtained.
With this type of arrangement, maximum energy saving, optimum ware and tare and reduced maintenance can be achieved even without the inclusion of a variable speed compressor.

The prohibiting factor with variable speed technology occurs when the motor speed drops down to 40% - the rotary screw compressors efficiency disappears dramatically. The energy saving consideration at this point should thus revolve around the actual length of time that the plant demand runs at this capacity and is most likely to occur when used for top up or running in tandem with a base-load compressor.

Another consideration is the leak factor in an air reticulation which could easily consume or diminish any potential saving achieved with variable speed as the nature of the technology will automatically top up the losses, turning the VSD into a base load compressor and causing the unit to run flat out unnoticed.

This is when a multiple installation of compressors with the smallest unit sized for operation below the 40% threshold, could compliment or better energy saving beyond the limitation of the VSD.

An installation incorporating a variable speed compressor, will function as described in the following paragraph and can tangibly offer energy savings sometimes to the same level as an installation incorporating fixed speed compressors managed by a pre-programmed computer controller, but obviously at a premium determined by the cost for this the latest type of technology.

ENERGY SAVING CONTROL INCORPORATING VARIABLE SPEED AND RUNNING UP TO 3 COMPRESSORS

The Variable Speed will start up (soft start starting) and raise the system to the desired operating pressure. Once the Variable Speed drive reaches 90% of its speed band the inverter will automatically activate the start up of the nominated base load compressor under soft starting conditions as the air reticulation is already charged up to full pressure. The base load compressor will then assume maximum load and the Variable Speed will reduce its running speed to the actual demand level, thereby ensuring maximum potential energy saving.
When the air demand changes and the Variable Speed runs down below 40% speed it will automatically de-activate the relevant base-load compressor rendering it to standby status and the smallest compressor in the system or by the Variable Speed will re-assume the load required. Once again ensuring maximum energy saving potential by optimizing running speed against the actual demand required.

This type of system can offer tangible energy saving of up to 35%+/- as well as reducing maintenance costs associated with compressors that are constantly operating in on-load off-load cycles. This is a very important consideration in view of long term energy and maintenance cost saving rather than short terms savings to meet a Capital expenditure budget.

Energy saving controlled by an Air Management System running 3 or more standard and base load air compressors

Further effective plant reliability, efficiency and expansion capacity could also be accomplished by having a multiple compressor installation, sized in accordance with plant usage, normally determined by conducting an air-audit.

This constitutes the installation of a compressor System incorporating units with different capacities connected into a common plant manager (Industrial Computer). This type of system will always run at maximum efficiency and create a fixed energy saving value of up to 35%+ even when the air demand drops below the 40% threshold which is a restricting factor with VSD technology.

It will also have the ability to deliver a certain % above the normal capacity required by the plant, obviously subject to the actual units selected.
The Industrial Computer will schedule planned maintenance, balance loading and running hours, which translates into maximized maintenance interventions periods, real maintenance costs savings and effective cost reductions over the life cycle period of the plant while assuring 100% + standby ability at all times as well as fully utilizing the standby plant at all times.