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HIGH PRESSURE CONTROLS

Most safety codes are written with the thought that high pressure controls are designed only to protect the system from excessively high pressures. Field experience strongly indicates that the action of the high pressure control in itself in responding to a high pressure condition may in fact be a source of a much higher percentage of compressor failures than is commonly believed.

For many years, automatic reset controls were commonly applied on most installations, based on the theory that if the cause of the high pressure was a "nuisance" such as a piece of paper, the automatic reset control would allow continued operation. Field observation would indicate the "nuisance" theory is not supported by experience, and the great majority if not all trips on a high pressure control require service attention.

Experience and failure patterns strongly indicate that an automatic reset control by its inherent nature can be a direct threat to the compressor life, since short cycling is unavoidable should condenser fan failure occur. In modern applications, the great majority of both air conditioning and refrigeration equipment is located either in an isolated machine room, or in a remote installation where the operation is not monitored.

While the motor protector will provide protection for a reasonable period of time against overheating due to short cycling, a failure due to loss of lubrication is an equally serious potential

hazard. Each time the compressor starts, some oil is lost from the crankcase due to foaming, and under short cycling conditions, the compressor does not run long enough to return an equivalent amount of oil from the system. As a result, eventual bearing failure occurs. Regardless of the nature of the damage, short cycling for extended periods of time on the high pressure control is almost certain to result in compressor failure.

Failures of this type can be prevented by the use of manual reset high pressure controls, or by lock-out circuits which require manual reset. Condenser fan motors do fail, and fan motor belts in the best of circumstances have a limited life.

Safety codes can be satisfied with either an automatic or manual reset control, but if the system designer is at all concerned with the system reliability and compressor protection, a manual reset device is clearly preferable.

Copeland strongly recommends a manual reset high pressure control to provide both protection against high pressure and adequate compressor protection.

