Carlyle

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High Pressure Switch Settings & Blown Internal Relief Valve with Carlyle 06ER Compressors

Carlyle has recently received sporadic reports of blown or leaking relief valves in our 06ER or 06EM compressors. These compressors are supplied with an internal relief valve to meet National Safety Code requirements. This relief valve is designed to open when a 400 psi high to low side differential pressure is exceeded. When this switch opens and relieves the high side pressure to the low side, the valve should remain functional but it may relieve at a lower pressure in the future. In addition, when the valve opens, small amounts of system contaminants may be trapped in the relief valve seat area and allow a small but continuous high to low side leakage within the compressor.

Carlyle believes this problem occurs primarily in low temperature systems with the newer high-pressure refrigerants such as R-404A, R-507, and R-402A. These new refrigerants have resulted in system manufacturers selecting higher-pressure switch cutout settings. These new settings are in the 400-psi cutout range and in low temperature systems can allow the compressor to approach or reach the differential pressure required to open the relief valve. This is even more likely if the relief valve has a setting on the low side of its opening tolerance and the high-pressure switch is at the high side of its trip tolerance.

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In any instances where high over-pressure conditions have occurred, the compressor should be investigated to ensure the relief valve is operating properly. When the valve opens or is leaking the following may occur:

1. An excessive high to low side leak is found when compressor is pumped down and shut off. Typically, the only other problems which can cause this type of leakage are damaged discharge valves, or blown valve plate and/or cylinder head gaskets. If these are inspected and found to be in good condition in these high-pressure refrigerant applications, the relief valve should be considered.

2. Motor compartment runs much hotter than normal with compressor running.

If either of these conditions occur, the cause may be the internal pressure relief valve and it should be replaced.

In startup of new systems or trouble shooting problem applications, it is sometimes desirable to determine that the high-pressure switch is set properly. With the new high-pressure refrigerants noted above, it is important to avoid checking this switch when it is connected to the compressor. If the setting is near 400 psi, it may inadvertently open the relief valve and cause the problems noted above. In cases where it is necessary to check the high-pressure switch trip setting, it is recommended it be removed from the compressor.