BULLETIN

CARLYLE COMPRESSOR DIVISION

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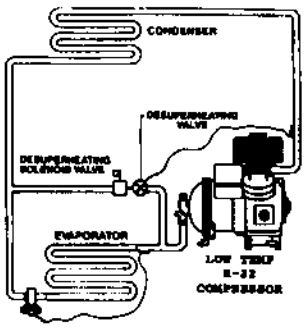
☒ **PRODUCT** ☐ **GENERAL** ☐ **SERVICE & PARTS**

Date: 13 September, 2002 Number: 02T-3 Issued By: P. Tollar

Subject: ***SINGLE STAGE, LOW TEMPERATURE R-22 APPLICATIONS***

Product Name **06DR & 06ER**

Product Family



SINGLE STAGE, LOW TEMP. R-22 SYSTEM

In previous bulletins, Carlyle has approved the current series of high efficiency 06DR and 06ER compressors for low temperature R-22, R-404A and R-507 single stage applications and provided capacity control limits. The purpose of this bulletin is to summarize this information and provide additional application recommendations.

The following requirements apply for R-22 low temperature applications:

1. All 06DR and 06ER compressors require the use of a cylinder head cooling fan assembly for single stage applications below 0° F.
2. In order to maintain 230° F discharge temperature, all 06DR and 06ER compressors require desuperheating valves. Below is a list of the compressors and corresponding valve sizes.

Compressor	Valve Size	Carlyle Part Number
06DR109	½ Ton	EA11ZC011
06DR013	½ Ton	EA11ZC011
06DR316	½ Ton	EA11ZC011
06DR718	½ Ton	EA11ZC011
06DR820	½ Ton	EA11ZC011
06DR724	½ Ton	EA11ZC011
06DR725	½ Ton	EA11ZC011
06DR228	½ Ton	EA11ZC011
06DR337	½ Ton	EA11ZC011
06DR541	½ Ton	EA11ZC011
06ER450	1 Ton	EA11ZC022
06ER465	1 Ton	EA11ZC022
06ER475	1 Ton	EA11ZC022
06ER399	1 ½ Ton	EA11ZC030

All valve sizing was done based on -30° F saturated suction, 110° F saturated discharge, and 65° F return gas temperatures. The part numbers indicated are for Sporlan Y-1037 temperature responsive expansion valves. Other injection valves that inject liquid into the suction line based on a sensing bulb on the discharge line, or a sensor installed in the head, can be used, based on Carlyle approval. The bulb should be located on the discharge line 6" to 12" from the discharge service valve and set to control the temperature at 230° F. Wrap the bulb with a high-temperature insulation material to ensure an accurate reading. Connect the liquid injection line into the suction line no more than 6" from the suction service valve. The desuperheating valve should be located no further than 16" from the suction service valve.

3. A normally closed solenoid valve is required before each desuperheating valve to prohibit liquid refrigerant from flooding the compressor during an off cycle. The solenoid must be interlocked with the compressor contacts so that when power is disengaged, the solenoid valve will close, protecting the compressor from flooding.
4. The use of capacity control is limited to one bank on either 4 or 6 cylinder 06D/E compressors. The saturated suction temperature must not be allowed to drop below -25° F. Unloading is only allowed with systems that are charged with mineral oil or Alkyl-Benzene oil. It is recommended the compressor be operated loaded for 60 seconds every 2 hours to prevent oil from collecting in the compressor or other portions of the system.
5. Approved mineral oil or Alkyl-Benzene oil should be used with R-22. Carlyle does not recommend the use of POE oil with R-22.
6. Liquid injection desuperheating valves are not required with R-404A/507 systems for saturated suction temperatures down to -40° F and saturated condensing temperatures less than 130° F.

One of the biggest issues with single stage, low temperature R-22 systems is high discharge temperature. This is the reason why liquid injection into the suction line is required. By reducing the temperature of the refrigerant entering the compressor, the discharge temperature is also reduced. Carlyle's data is based on a return gas temperature of 65° F prior to liquid injection. 65° F is generally considered a worst case scenario for low temperature applications. In field applications, return gas temperatures are usually lower than 65° F. This can be accomplished by shorter and better insulated suction lines. If the return gas temperature is lower than 65° F, less or even no liquid injection will be needed.

Carlyle's goal is to offer a complete line of compressor technologies for refrigeration applications. This gives the customer the opportunity to choose which type of operating system they prefer. Carlyle has an excellent field reliability record over the past several years with single stage, low temperature R-22 systems. An attractive feature of this system is its ability to easily adapt to HFC alternatives at a later date.