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Application Note:
APPLYING INVERTERS TO CENTRIFUGAL COMPRESSORS IN HVAC CHILLERS

**Please refer also to the
Inverter Instruction Manual**

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When applying an inverter to centrifugal compressors on HVAC chillers, there are a number of factors to consider.

For some compressors, lubricating oil circulation may be driven by the rotation of the compressor shaft itself, via a gear-driven pump arrangement. If you slow the motor speed, the volume of oil provided for bearings, etc. will be reduced. The lube oil pump may have to be replaced or modified. Consult the compressor manufacturer to determine any special requirements. Not all centrifugal compressors can be adapted cost-effectively to variable speed operation.

Some chillers have built-in logic which may be tied into the existing starter. A modification may be required from the chiller manufacturer to allow proper operation with a VFD. You may need to bypass the control logic of the existing chiller and use temperature or pressure feedback and PID to optimize speed control while not compromising the safeties of the built-in logic system. Speed control should take precedence over compressor vane control. Compressor vanes should be fixed fully open until speed control is no longer effective (at low loads). A minimum speed should be configured for the inverter. Below that level, vane control should be used to adjust to the load. Consult the chiller manufacturer for specific recommendations.

Depending on the chiller load profile, a savings of as much as 30-40% per year could be realized. However, if chiller loading remains near 100% most of the time, energy savings will be slight.

Energy saving potential with reciprocating chiller compressors is minimal. These are constant torque loads, and do not offer significant energy savings potential. Screw-type compressors present other technical problems, and are probably not suitable for use with inverters. Again, consult the chiller manufacturer for specific recommendations.

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