CT™
Hermetic Reciprocating Compressors

For OEM Applications
**CT™ Compressors… Technology of the Past, Present, and Future.**

**High Efficiency**

CT™ compressors have EER levels better than most hermetic reciprocating compressors and equal to some scroll compressors.

Their high efficiencies originate from the Acousti-cool process, aluminum components, unrestricted suction gas flow, and close design tolerances.

CT™ compressor product philosophy revolves around two fundamental principles:

- The compressor must be able to protect itself in all systems with minimum reliance on system controls.
- Compressor reliability and durability is proven in the laboratory, not at the customer’s site.

These two principles have been continually improved, and today’s CT™ reciprocating compressor remains a world leader.

The Trane CT™ reciprocating compressor is for OEM customer applications.

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### Efficiency Tier

<table>
<thead>
<tr>
<th>Efficiency Tier</th>
<th>Size Range</th>
<th>Voltage</th>
<th>EER</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Single Cylinder</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Standard Efficiency</td>
<td>13,600–36,400</td>
<td>200/230-60-1</td>
<td>Up to 10.8</td>
</tr>
<tr>
<td>High Efficiency</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 phase</td>
<td>13,900–27,200</td>
<td>200/230-60-1</td>
<td>Up to 11.3</td>
</tr>
<tr>
<td>3 phase</td>
<td>15,900–36,400</td>
<td>200/230-60-3</td>
<td>Up to 11.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>460/60/3**</td>
<td></td>
</tr>
<tr>
<td>50/60 hertz</td>
<td>13,600–30,700</td>
<td>200/230-60-1*</td>
<td>Up to 11.1</td>
</tr>
</tbody>
</table>

| **Two Cylinder** | | | |
| Standard Efficiency | 31,200–62,700 | 200/230-60-1* | Up to 11.2 |
| High Efficiency | | | |
| 1 phase | 26,600–62,900 | 200/230-60-3 | Up to 11.5 |
| 3 phase | 26,900–73,900 | 200/230-60-3 | Up to 11.8 |
| | | 460-60/3** | |
| | | 575-60-3 | |

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Notes:

*Alternative voltage 200/230-50-1

**Alternative voltage - 380/415-50-3

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**Internal Pressure Relief valve (IPR)** - high pressure protection for a longer life.

**Metal-to-glass hermetic terminal** - insulates terminal from steel shell, and prevents electrical and refrigerant–oil leakage.

**Pearlitic (super-hard) cast-iron cylinder liners** - superior wear resistance for long life.

**Aluminum pistons and connecting rods** - lighter weight provides for quicker starts and lower stresses.

**Special valve steel** - made from one of the world’s finest steels, so impact-resistant that valve stress is not a problem for the CT™ compressor.

**Aluminum pump body** - dissipates heat faster and runs cooler.

**Internal spring mounting** - double spring mounting reduces motor vibration and noise. The design is so unique it’s patented.

**Heavy steel shell** - withstands many times normal operating pressure. Seals oil and refrigerant in and keeps contaminants out.

**Special oil** - specially refined and formulated to keep internal parts lubricated and running smoothly.

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An all-aluminum frame, motor housing, piston, and connecting rod reduce thermal stress and help the compressor run cooler by dissipating heat away from the bearing surfaces.

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Also eases liquid-refrigerant stresses. The sculptured piston head, full upstroke, yields higher volumetric efficiency. The cylinder liner is used for durability. A pearlitic cast-iron compressor’s all-aluminum frame and motor housing dissipates heat away from bearing surfaces. This reduces thermal stress and allows the compressor to run cooler than cast-iron-frame compressors. The frame’s light weight reduces stress on the mounting springs. The frame is designed with a very large intake area to minimize the dynamic pressure drop of suction gas. Suction gas flow to the valve is virtually unrestricted.

Valve design is critical to liquid refrigerant tolerance. On cool days, liquid refrigerant can accumulate in the suction line and flood the compressor on startup. Because of this, the valves must be able to tolerate some slugging. The CT™ compressor valve assembly has been designed to allow liquid refrigerant to be expelled from the cylinder without damaging the valves.

All CT™ reciprocating compressors have the discharge line routed through the compressor sump. With the compressor running, the hot discharge line vaporizes liquid refrigerant in the sump, separating it from the oil. In the off cycle, Trane recommends the use of crankcase heat on all compressors to vaporize liquid refrigerant and maintain proper oil temperature.

CT™ compressors have an average of 25 percent more volume inside the shell than other compressors. This gives them additional safety margin against slugging caused by overcharging or low indoor airflow. With a large shell design, CT™ compressors eliminate the need for suction line accumulators on most systems.

How Acousti-Cool™ Motor Temperature Management System Works
Refrigerant is returned to the compressor through the high-level suction inlet. As gas is drawn into the compressor, it is approximately 100 degrees cooler than the motor windings. The gas enters the motor–cap and flows across the top of the motor. The gas continues through the top of the suction tube and enters the cylinder with no more superheating. When the suction valve closes, the incoming gas flow stops until the next intake stroke. This abrupt stop creates a pressure pulse that travels backward at the speed of sound along the inlet path. The pulse of refrigerant vapor hits the top of the motor, muffling noise and cooling the windings.

The lower superheat means higher compressor efficiencies (EER). While being cooled, the motor–cap acts as a suction gas muffler. Since potential sound energy is absorbed simultaneously with return gas motor cooling, the process is called Acousti-Cool.

Acousti-Cool is an engineered motor-temperature management system. Managed motor cooling allows the compressor to run cooler than other hermetic compressors, for longer motor life and lower operating costs.

Internal overload - provides over-temperature protection caused by low refrigerant pressures, or by excessive electrical current resulting from extreme operating conditions. Resets itself, avoiding service calls.

Motor winding insulation - super-strong epoxy locks the windings in place and prevents erosion of insulation by refrigerant and oil.

Rotalock™ fittings - unique design makes compressor service quick and easy, should it ever be required.

Internal muffler - reduces compressor sound and vibration levels for quieter operation.

Alternate Refrigerants
Trane is looking toward the future to ensure that the CT™ compressor meets your needs for environmentally safe refrigerants.

The current R-22 compressor design, with mineral oil, will continue to be built well into the future, then switched to R407c with polyolester oil at the appropriate time to support those compressors in the field.

Trane is also developing new CT™ R410a compressors, with polyolester oil, which will meet the requirements of the Clean Air Act found in the Montreal Protocol.

The Trane CT™ compressors are among the most efficient in the industry and will meet or exceed all known and anticipated energy standards, including the discontinued use of HCFC in new equipment by 2010.

Reliability and Durability
The CT™ compressor, the world’s first reliable heat-pump compressor, debuted in 1964. The compressor has undergone numerous redesigns, all-the-while maintaining its pre-eminent reputation in the industry.

The CT™ compressor utilizes aluminum pistons and connecting rods. The lightweight aluminum provides for easy starts and relieves stress on the crankshaft. Trane uses an industry-unique pearlitic cast-iron cylinder liner for durability. For superior sealing at all heat-pump operating ranges, Trane uses a cast-iron compression ring.

The CT™ compressor’s all-aluminum frame and motor housing dissipates heat away from bearing surfaces. This reduces thermal stress and allows the compressor to run cooler than cast-iron-frame compressors. The frame’s light weight reduces stress on the mounting springs. The frame is designed with a very large intake area to minimize the dynamic pressure drop of suction gas. Suction gas flow to the valve is virtually unrestricted.

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Crankcase Pressure Recovery
The CT™ reciprocating compressor utilizes an enclosed crankcase. Enclosing the crankcase protects the critical connecting-rod-to-crankshaft journal bearings by limiting the amount of liquid refrigerant and particulates in the bearing area. The oil sump is separated from the spinning crankshaft, providing an undisturbed oil supply.

During the downstroke (expansion), pressure in the crankcase increases, injecting a small amount of refrigerant into the oil. This produces a small layer of oil foam that minimizes sound transmission. Crankcase pressure developed during the downstroke is recovered in the upstroke (compression), contributing to high efficiencies.

Serviceability
All CT™ compressors feature highly reliable Rotalock mechanical fittings. Rotalock fittings allow easy service and replacement because no brazing or cutting is required. They eliminate safety hazards that can exist when unbrazing a compressor.

Relentless Testing
In addition to using industry-standard application guidelines, we develop our own tests based on field experience and in-house testing. The compressor is tested in Trane’s unique System Extreme Environmental Test Center (SEET), and undergoes a tortuous 16-week test period in which five years of field stress is duplicated. This has led to continuous application and design changes, and improvements in Trane CT™ compressors.

The Trane CT™ compressor is designed to operate successfully in all types of applications. Never before has one compressor design been so successful. This compressor gives you and your customer confidence that the compressor in your unit has the most-proven track record in the industry.