



Keep your cool when the power goes out

CenTraVac chillers deliver rapid restarts to get you back on line faster



How Trane delivers Rapid Restart

Our equipment, controls and operating procedures make every second count.

- Trane HVAC system design is optimized for fast restart
- Advanced features and functionality are built into the CenTraVac chiller
- CenTraVac chiller controls are designed and engineered for fast restart
- Proven operational procedures get the system back online as quickly as possible

Trane CenTraVac® chillers offer reliable performance under normal operating circumstances. Under the extraordinary circumstances of a power outage, Trane really shines through.

While chillers from other manufacturers can take up to 15 minutes to restart – four to six minutes at best – **CenTraVac restarts a compressor in as little as 43 seconds** after regaining a power source.

If you are like many Trane customers, Rapid Restart™ disaster recovery chiller system is more than a matter of building comfort and occupant convenience. Safety or quality control makes it imperative to prevent overheating of your data center.

Rapid Restart requires no additional purchase: it is simply one more benefit to installing a Trane CenTraVac system.

The mechanics of superior protection

Many factors influence chiller restart times, such as

- Chiller configuration
- Type of power loss (momentary brownout vs. blackout)
- Operation prior to restart attempt
- Stop to start timer of the chiller controller
- Oil pressure
- Chiller controller reboot time
- Chiller controller ability to manage diagnostics
- Time needed for chiller to achieve near full load capacity

Reduces thermal storage cost

The faster a chiller restarts, the smaller its chilled water tank needs to be. For buildings that utilize chilled water storage, the storage system can be smaller, less expensive and take up less space.



Use Trane chiller controls for even greater reliability and performance

Standard controls

- Adaptive Controls™ enable the CenTraVac® chiller to adapt to changes and adverse conditions so it continues to operate as long as possible
- Control protocol options: BACnet™, LonTalk™, Modbus®

Optional controls

- Variable Primary Flow Optimization offers the key to proper control. Trane CenTraVac chillers have the fastest rate of change in flow in the industry.

Rapid Restart™ disaster recovery chiller system is just one of many CenTraVac benefits

CenTraVac chillers offer many additional benefits

- High energy efficiency
- Future scalability
- Industry-leading reliability

Find out how a Trane CenTraVac chiller can fit into your plans and budget. Contact your local Trane representative today.

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LonTalk™, BACnet™, Modbus®



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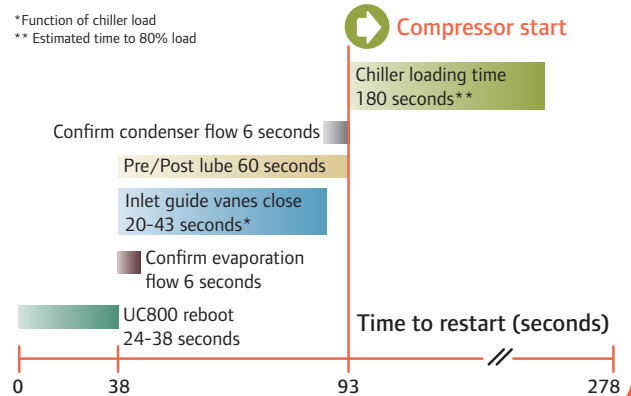


CenTraVac chiller design is optimized for fast restart at every point in the process

Restart time is even faster when the unit controller is backed up by an uninterrupted power supply (UPS). With a UPS, compressor start time has been proven at 43 seconds.

CTV AdaptiView simplex restart time complete power loss (without UPS)

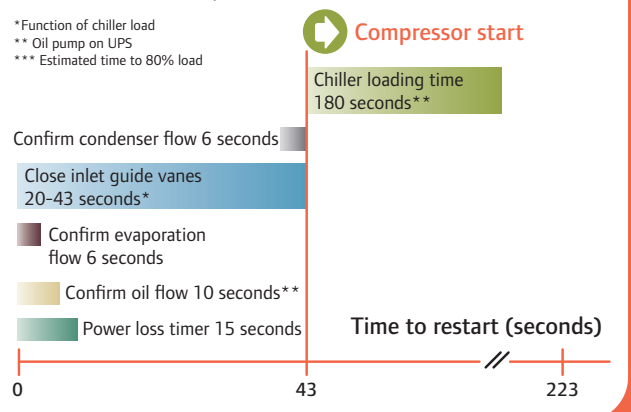
*Function of chiller load
** Estimated time to 80% load



CTV AdaptiView simplex restart time power loss (wth UPS)

Assumes chiller starter power restored within 120 seconds

*Function of chiller load
** Oil pump on UPS
*** Estimated time to 80% load



Restart times are calculated with the following assumptions:

- No latching diagnostics to prevent the chiller from starting
- Oil temperature above set point
 - Oil temp > saturated evaporator temperature + 30°F and oil temperature minimum must be 100°F
- Motor temperature sufficient for a start below 235°F
- Restart inhibit not activated
- Power up start delay set point set to 0 minutes
- Stop to start timer set to 5 seconds
- Evaporator and condenser water flow (6 seconds of flow needed for verification)
- Inlet guide vanes fully open at time of power loss (IGVCT = 43 seconds)
- There is a call for cooling (differential to start or stop)