

Subject: Water Condenser Chiller Overview	Product: Z1000 and P1000 Drives	Doc#: AO.AFD.59
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## Water Condenser Chiller

### Application Overview

A water condenser chiller is a refrigeration device that transfers heat from one element into another. Most of the energy consumed by a chiller is used to move refrigerant vapor from the evaporator (low pressure) to the condenser (high pressure). Lowering condenser water temperature decreases the pressure differential, so the compressor does less work.

### Application Challenges:

- Reduce initial costs – Include a controller.
- Reduce energy consumption – Provide improved efficiency and reduce energy requirements.
- Provide continuous operation – Restart a spinning motor after momentary power loss.
- Provide harmonic suppression – Include built-in or optional DC link choke.

### Yaskawa Products:

Product	Feature	Benefit
<b>Z1000 Drive Family or P1000 Drives</b>	Energy saving controls	Operate the drive directly with built-in 4-20 mA terminals.
	Maintain a minimum speed.	Set the frequency reference lower limit.
	Switch to a line power supply.	Operation is not interrupted.
	Continue running after momentary power loss.	The motor continues running even after a (2 sec) momentary power loss.

### Application Details:

Incorporation of Yaskawa's variable speed drive technology into cooling tower, compressor and pumping applications provides cost savings through precise speed regulation, digital repeatability of operating parameters, flexibility, and simplified automation control.

The chiller condenser water reset option enhances chiller efficiency, to reduce energy consumption. As the pressure differential between the evaporator and condenser increases, the compressor must work harder to move the refrigerant. Lowering condenser water temperature decreases this pressure differential, so the compressor does less work. Reducing the temperature of water leaving the tower can increase the operating efficiency (kW per ton) of a chiller.

The speed search function enables restarting a drive after momentary power loss (2 s) or when switching the

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motor from commercial line power to drive power. When power returns, the speed search function discovers the speed of the coasting motor and resumes operation without requiring a stop. The variable speed drive can operate directly with a 4-20 mA signal via external terminals. The drive can also maintain a set minimum speed.

A DC Link Choke is an inductor located in the ripple filter circuit in some drive ratings. The DC Link Choke reduces current distortion by approximately 45%, resulting in energy savings.