

Demand Flow

Energy Efficiency for your data center – Application Sheet.
Data center solutions from Siemens for the factories of the 21st century.

Siemens Demand Flow maximizes efficiency, increases nominal capacities, and simplifies plant operations of water-cooled chilled water plants.

General information / customer challenges

This energy saving application guide is one in a series of energy efficiency documents created by Siemens to highlight the energy saving potential in data centers. This guide contains standard applications that can be used independently or as part of an overall program of measures to save energy and reduce costs. The applications range from simple algorithms commonly found in cooling systems, ventilation and air-conditioning plants to advanced monitoring and performance contracting to help implement these measures.

Demand Flow™

Siemens has developed a patented and proven chiller plant optimization technology that produces 20% to 50% energy savings with rapid investment payback while reducing long-term maintenance costs and extending the life of the plant equipment.

The technology combines many improvement measures used in the past but achieves savings with a new, balanced, holistic approach that has a dramatic effect on the energy consumption of the entire chilled water system.

Essentially, it optimizes all energy-consuming components controlled by the system algorithms, independently of load and in a manner that simplifies system operation. Investment payback periods of 1 to 5 years are typical for projects where energy costs average €0.08 per kWh.

On projects where energy costs average €0.14 per kWh, investment payback periods have been less than 2 years.

Demand flow is a unique optimization application for water-cooled, central chiller plants that automatically optimizes the plant given the varying load conditions throughout the day and throughout the year.

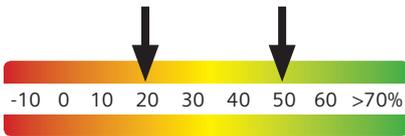
It is an energy solution with proven savings for all types of facilities and especially for critical environments such as data centers and industrial processes.

Demand Flow controls and sequences the operation of the entire chilled water plant, including the chillers, condenser water pumps and the chilled water supply pumps. It optimizes temperature and pressure set points for chilled water and condenser water while controlling pump and fan speeds to maintain the optimal energy balance.

Because of its balanced approach to all components of the chilled water system it does not generate savings in just one area or utilize more energy in another area, like other solutions that have been presented to the industry in the past.

The solution uses variable speed pumping on both chilled and condenser water flow and resets pumping on both chilled and condenser water flow, based on load and a patented Variable Pressure Curve Logic (VPCL).

Estimated savings potential



These values are guidelines only based on data from actual Siemens projects. The energy savings potential must be calculated individually for each project.



Water-cooled chiller plant using Demand Flow

The control panel calculates the optimal variable chiller pressure curve while the algorithm resets systems, pressure as pump speed varies along this variable system pressure curve.

Demand Flow works with all BACnet compatible control systems including Siemens Designo and Apogee. It also is compatible with Siemens S7 PLCs.

Conclusions

Siemens Demand Flow maximizes efficiency, increases nominal capacities, and simplifies plant operations of water-cooled chilled water plants. Siemens Demand Flow goes beyond simply maximizing the efficiency of the chillers and includes all the subsystems of a chiller plant. Chillers, chilled water pumping, condenser water pumping, cooling towers and even air side (if VAV) efficiency savings are addressed holistically to deliver maximum energy savings without sacrificing occupant comfort.

Customers

Demand Flow is a comprehensive strategy that optimizes all energy-consuming components of a water-cooled chilled water system holistically without sacrificing supply temperatures for energy savings. This solution is installed in over 200 building installations in all vertical markets. Installations include data centers, universities, manufacturing/industry facilities, hospitals, office buildings, hotels/resorts and specialty facilities such as the Aquarium of the Pacific in Long Beach, California.

Restrictions

The solution is not applicable to absorption chillers. It would be applicable to air cooled chillers but the optimization potential is then limited to the primary chilled water pumps and therefore typically does not make economic sense.

Highlights

- Chiller plant energy savings of 20% to 50%
- Simplified plant operation
- Reduced long-term maintenance
- Extended equipment life
- Increases system deliverable tonnage
- Manages chiller "lift," effectively eliminating refrigerant flow issues at low load conditions
- Stable chiller refrigerant loop performance at virtually all loads
- Delivers colder chilled water for less money

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The information in this document contains general descriptions of technical options available, which do not always have to be present in individual cases. The required features should therefore be specified in each individual case at the time of closing the contract. The document contains a general product overview. Availability can vary by country. For detailed product information, please contact the company office or authorized partners.

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