

ARMSTRONG



Ultra-Efficient Chilled Water Plant Automation

FILE NO:	90.15
DATE:	JULY 06, 2012
SUPERSEDES:	90.15
DATE:	OCT. 7, 2011

In most buildings, managing the HVAC system for better energy efficiency presents a great opportunity for cost savings. However, many of the solutions for optimizing efficiency approach the issue of cooling through the building automation system (BAS), which can create unintended challenges.

When the chiller plant automation system is included as part of a facility-wide BAS, building managers are pushed to function as experts in too many different areas. A better approach is to consider the chiller plant as a separate system. This allows a building manager to take advantage of the control and automation functions available in a dedicated cooling management solution. Ultimately this leads to better integration of cooling system components and makes the chiller plant more efficient.

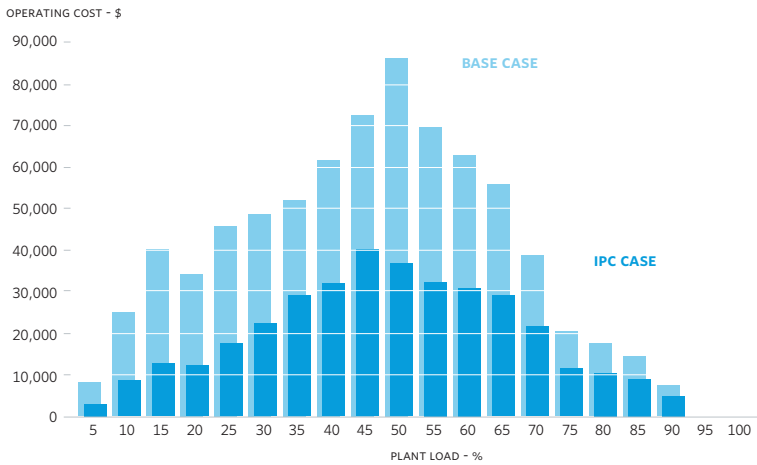
There are many reasons to consider an integrated control system for the automation of a cooling plant. For most building managers, system efficiency is the top priority. Given the operating costs related to heating and cooling a typical facility, even a small improvement in efficiency can lead to enormous savings.

Another priority for building managers is occupant comfort. Operating a building within a narrow temperature range is key to minimizing tenant complaints and turnover. All-variable plant automation is the most effective solution to minimize fluctuation in building temperatures.

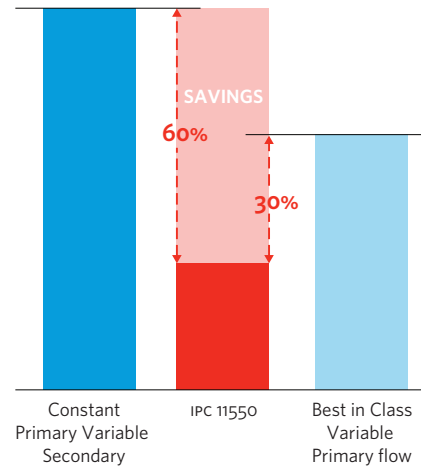
The Armstrong Integrated Plant Controller (IPC) 11550 is a user-friendly, dedicated chilled water plant automation system designed for occupant comfort and industry-leading energy efficiency. Unlike other plant control or automation systems, the IPC uses patented technology, which allows typical chiller plants to operate at 0.5 kW/ton (7.0 COP) on an annual average basis.

The IPC 11550 is equally suited to new construction and retrofit installations, in both dry and humid environments. Even new buildings with variable speed chillers can benefit from installing an Armstrong IPC 11550 and will reduce energy spending by as much as 30%. Energy consumption in older systems (constant speed components, constant flow) can be reduced by 60% or more.

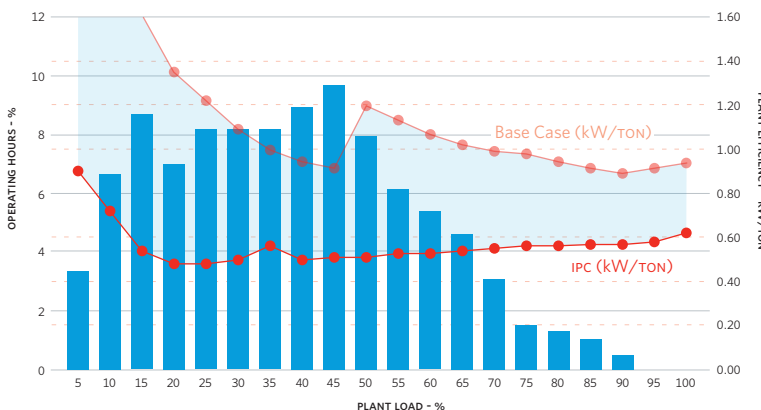
Chiller Water Plant Operating Cost



Chilled Water Plant Energy Usage



Chiller Water Plant Load Profile and Efficiencies



Note that even at full load an IPC installation is more efficient than the base case. This efficiency difference is the result of staging the chillers, pumps and cooling towers and the optimization of these components as one integrated system.

	BASE CASE*	IPC*
Plant load	2000 TONS	2000 TONS
Design systems Delta T (°F)	12	12
Cooling tower design Delta T (°F)	10	10
Cost per kilowatt hour (\$/KWHR)	0.1	0.1
Estimated average annual plant efficiency (kW/TON)	1.26	0.55
Annual energy cost	\$846,894	\$391,954
Annual energy savings	-	\$454,940
Location	RICHMOND, VA	RICHMOND, VA

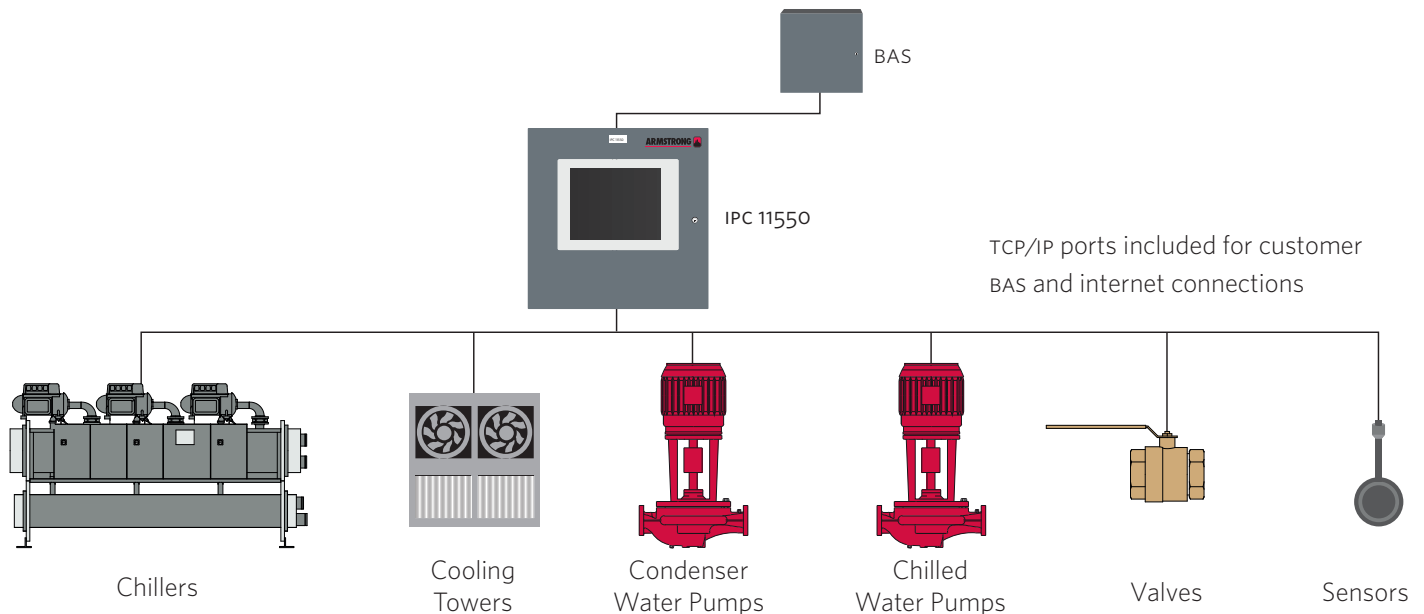
* Cooling system using 3 chillers, 1000 tons each in duty/standby

Applications: Water-cooled Chiller Plants

The IPC enables any commercial or industrial building to implement all-variable-speed control logic, the most efficient configuration for a chiller plant. This includes variable speed pumps, chillers and cooling towers. The IPC 11550 can also automate chiller plants using constant speed chillers to optimize efficiency.

The IPC can automate both variable primary flow (VPF) and variable primary, variable secondary (VPVS) chilled water systems. The standard IPC 11550 system configurations are available for plants with up to 5 chillers. Configured IPC 11550 systems can be engineered to order for larger project applications. The IPC 11550 can also automate plants that have waterside economizers, ground source loops or thermal energy storage systems.

The IPC 11550 is a Networked System



The IPC 11550 is installed in the mechanical room and connects directly to your plant equipment to communicate serially with those devices. The IPC can send data to the resident building automation system (BAS) and can receive instructions from the BAS, while having full accountability for all automation sequences in the plant.

The IPC 11550 integrates the operation of chillers, cooling towers, pumps, isolation valves and a bypass valve into one ultra-efficient system. Its architecture is based on high-level serial communication within a network of three control panels: the IPC 11550 master panel, the IPC 3500 control panel for chillers and CHW pumps, and the IPC 3600 control panel for cooling tower fans and cooling tower pumps.

Details of the IPC 11550 Offering

- Ultra-efficient demand-based control technology
- A complete plant automation system responsible for control of all device sequencing and safety systems
- Factory built and tested
- 15 IN. Touchscreen HMI
- Secure remote access via encrypted connection
- Field-adjustable alarms and notifications
- Data logging and storage of 30 system parameters for more than 10 years of system data
- Three levels of password protection for professional grade security
- Project Assist service ensures successful completion
- On-site commissioning, startup and training
- One year of quarterly reports and field calibration
- One year ECO*PULSE™ Health Management Service included
- IPC installations are supported by an extensive network of service representatives
- UL 508 or CE approved
- Internal terminal strip for landing terminations
- 28 user interface screens

User Interfaces

The IPC user interface is an icon based touch-screen with easy-to-navigate menus and user instructions. The IPC 11550 allows access through a secure web-based interface. This means users can view and manipulate all of the menus and system functions remotely. The dynamic user interface screens provide intuitive access to system data and controls. Through this interface users have easy access to piping diagrams displaying at-a-glance operating conditions and

status of all systems components with field-adjustable alarms and notifications. The IPC 11550 can send alert e-mails if the chiller plant needs attention. In addition, plant equipment data such as serial nameplate data, the equipment installation and operator manual are all stored within each equipment icon for easy access.

IPC 11550 Configuration

The IPC 11550 solution is available in two configurations:

1. IPC 11550 controllers
2. IPC 11550 system

The controller configuration includes the control panels. The system configuration includes the VFD's disconnects and power distribution center.

SYSTEM ARCHITECTURE	IPC 11550 CONTROLLERS	IPC 11550 SYSTEM
Master control panel (IPC 11550)	●	●
Hartman LOOP™ technology	●	●
Chilled water loop control panel (IPC 3500)	●	●
Condenser water and cooling tower control panel (ITC3600)	●	●
Mounting rack	●	●
Base superstructure		●
DP sensor(s) (1 per zone)	○	○
Four temperature sensors	○	○
kW meter	○	○
Flow meter	○	○
MCC style - circuit breaker for pump VFDs		●
MCC style - power distribution with step-down transformer		●
Interconnecting wiring		●
Main disconnect switch		●
Single point power connection		●
Condenser water pumps VFDs		○
Chilled water pumps VFDs		○
Cooling tower fans VFDs		○
VFD line reactors		○
Interpolating relays between terminal block and isolation valves	○	○
Bypass valve	○	○
Isolation valves	○	○
BAS communication card	●	●

● Included ○ Optional

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