



Automation for a Changing World

Delta Central Heating Solution

www.deltaww.com

 **DELTA**
Smarter. Greener. Together.



Smarter. Greener. Together.

Who We Are

Delta is a market leader that has won wide recognition as a:

- Global power and thermal solution provider for Apple, IBM, HP, Lenovo and more; No.1 in Switching Power Supply since 2002, DC Fans since 2006.
- Leading telecom power system provider for telecom carrier in Europe, Americas, Asia and emerging markets; Long term partnership with Vodafone, Orange, China Mobile, Telefonica and more.
- Leading brand in industrial automation application, factory, process, machine and robot; specific solutions for textile, packaging, machine tools and more.

About Delta Industrial Automation

Since the launch of our first AC motor drive in 1995, the Delta industrial Automation Business Group (IABG) has focused in automation technology with quality, reliability and precision to realize our promise of "Automation for a Changing World". We provide innovative automation products that include AC motor drives, power quality improvement devices, sensors, and control and motion devices. With enhanced integration and industrial network development, our industrial automation solutions find application in a broad range of machinery, including: metal processing machines used in the food industry, textile industry, chemical industry, electronics industry, plastic industry and more; automation equipment used in the pharmaceutical industry and printing industry; and energy-saving air-conditioning and water supply facilities used in buildings. Our mission is: "To elevate our living environment through advanced automation technology and value added innovation". With Delta's innovative, reliable, energy-saving automation solutions and rapid global service, we help make the world "Smarter. Greener. Together." with our partners and customers.

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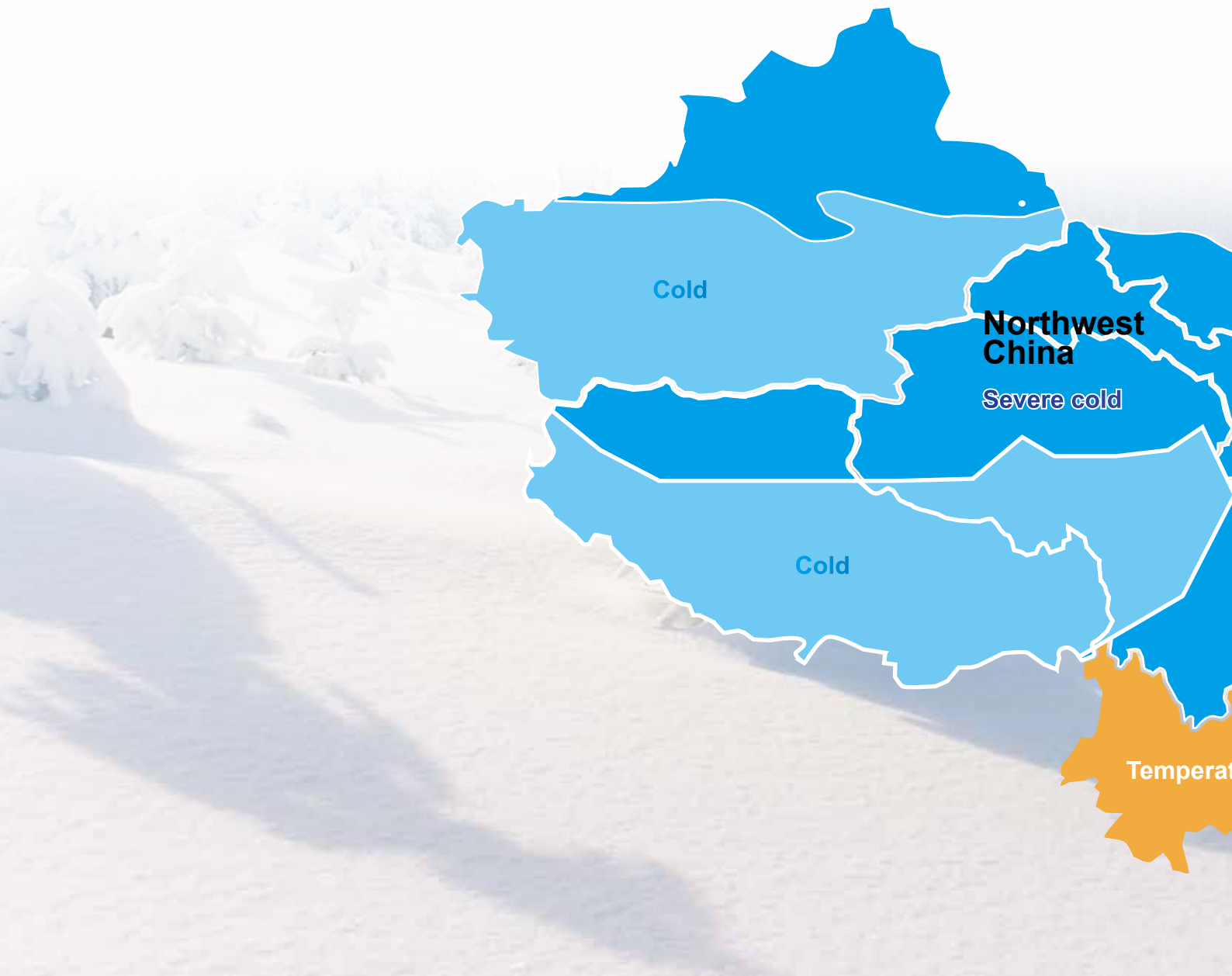
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Overview of China's Central Heating Industry

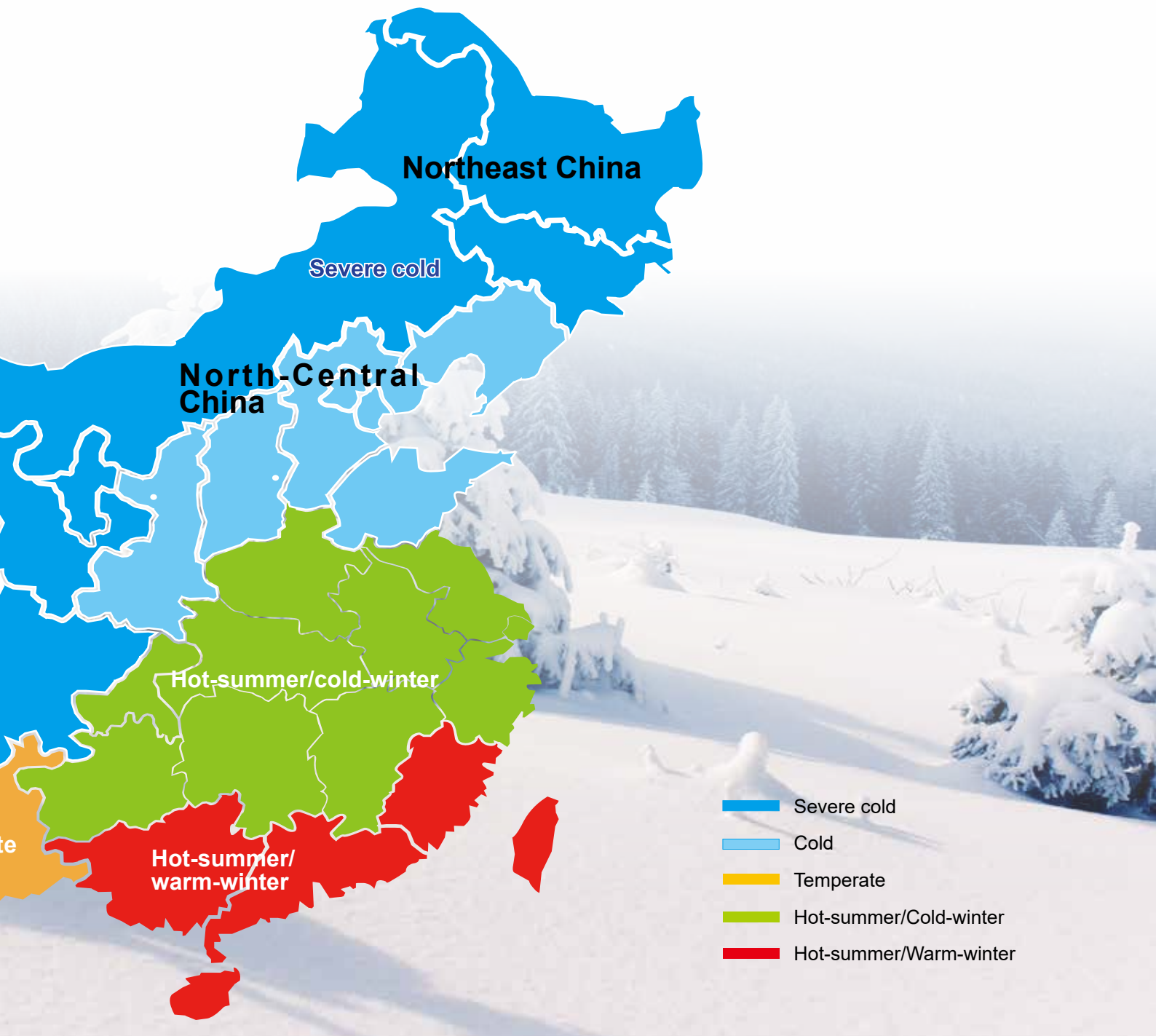
The importance of central heating in China has increased along with the country's rapid economic growth and improved living standards. More than 400 cities adopted central heating systems by the start of 21st century. The market has developed rapidly and offers many opportunities. However, China's central heating systems provide low energy efficiency that may result in losses of up to 24% of the country's total energy consumption by the year 2040.

With the brand promise "Smarter. Greener. Together", Delta provides a highly efficient, intelligent and energy-saving integrated solution for the central heating industry with programmable logic controllers, human machine interfaces, Ethernet switches, and variable frequency control drives with outstanding stability, reliability and safety. Delta provides integrated central heating solutions for a cleaner environment and a better tomorrow

Demand for a government-subsidized heating network in southern China was widely exposed and discussed in the media in 2012. This region belongs to the hot-summer/cold-winter climatic zone where 60~89 days of the year have temperatures lower than 5 °C , while more than 75 days are higher than 8°C . Summer is extremely hot while winter is cold and wet with



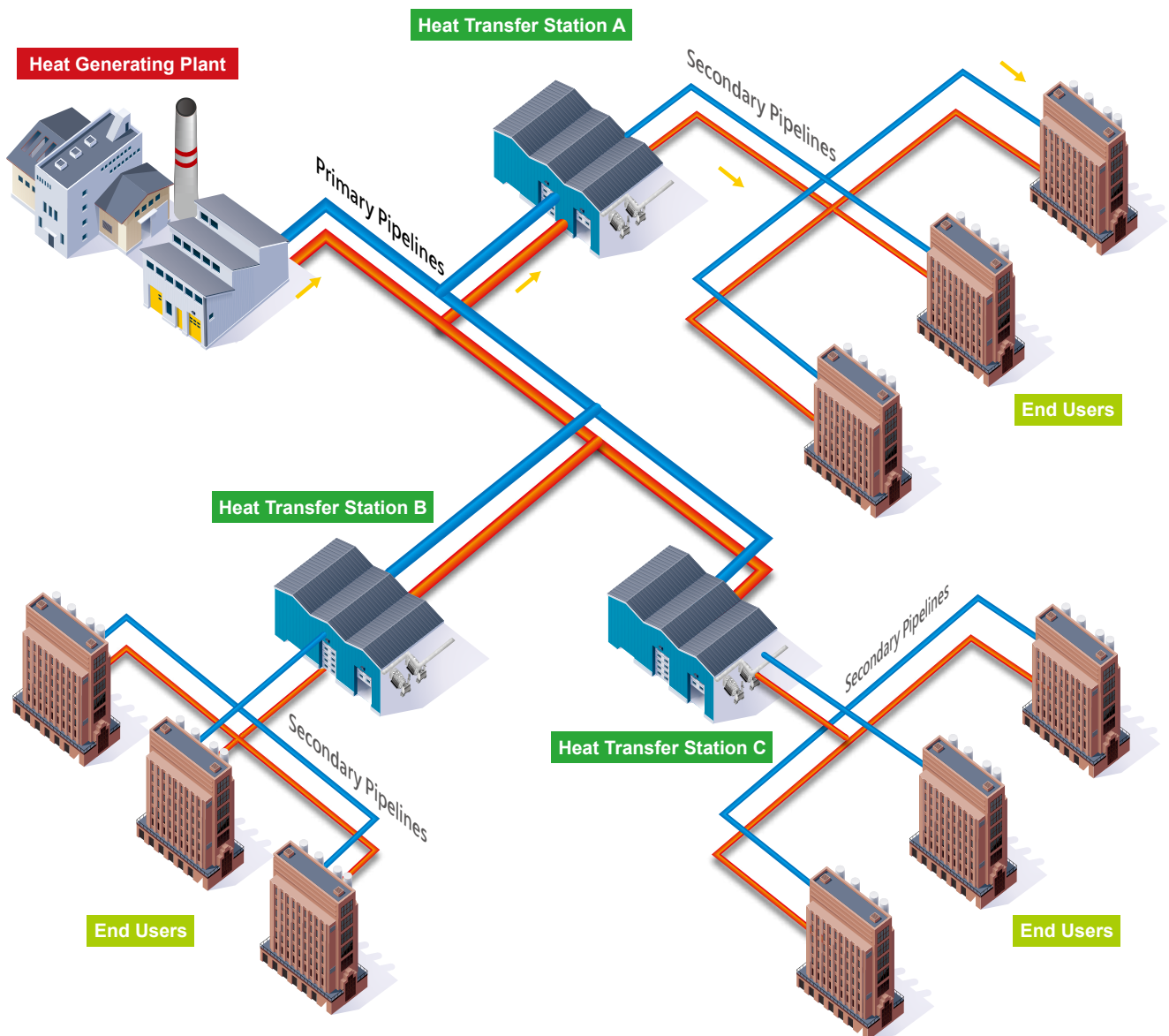
higher air humidity. When the outdoor temperature drops below 5°C , the indoor temperature drops accordingly and has a harsh effect on daily life. With social and economic development and improved living standards, households have gradually adopted central heating systems with most using distributed heating.



Central Heating Process

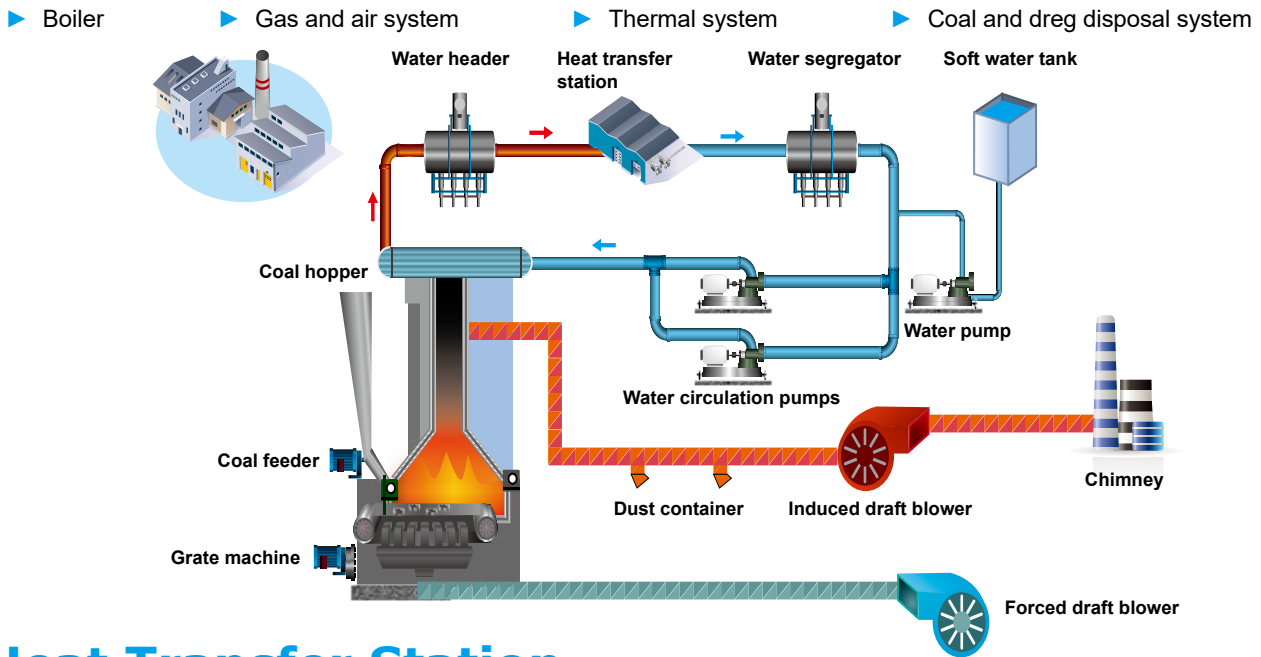
Central heating refers to the supply of warmth to the interior of a building through artificial methods. It keeps the indoor spaces at a certain temperature and provides proper conditions for living and working. A central heating system normally consists of three parts: heat generation, heat circulation, and heat distribution.

- ▶ Heat generation: Equipment with pressure or temperature parameter settings for generating steam or hot water.
- ▶ Heat circulation: Pipelines or channels that transfer warmth from the heat generators to end user sites.
- ▶ Heat distribution: Equipment that transfers warmth to the interior spaces.



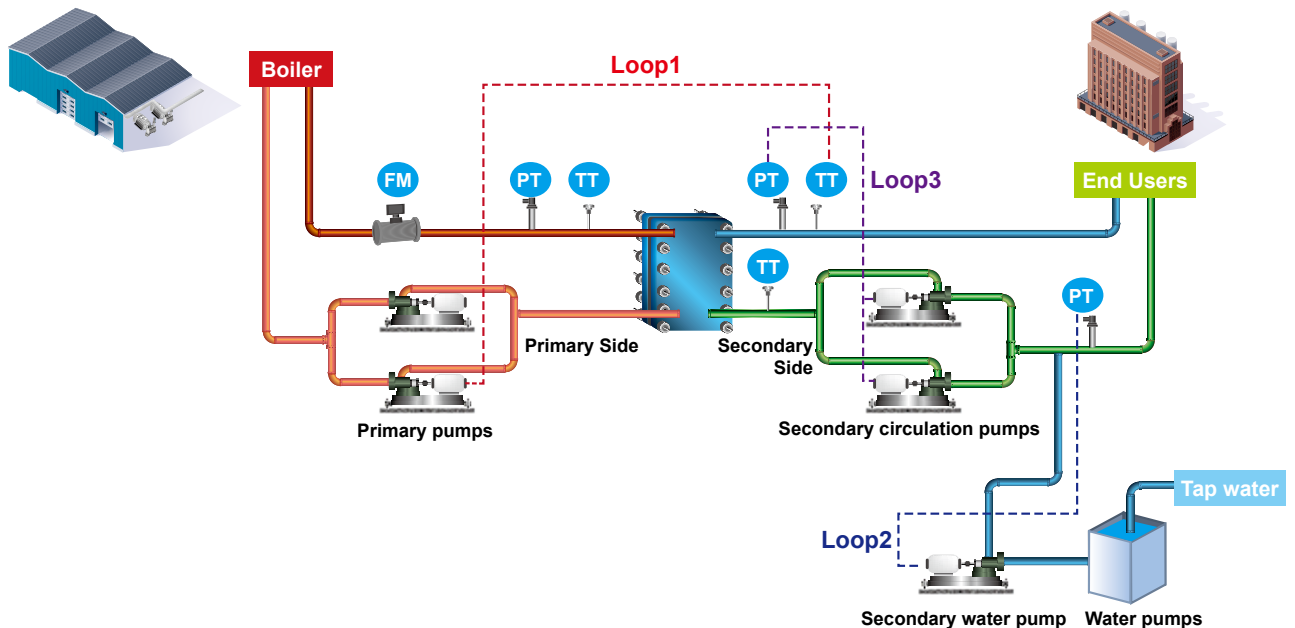
Central Heat Generating Plant

The central heat generating plant is where equipment with pressure or temperature parameter settings for generating steam or hot water is located. Boilers are the major source of heat for the central heating system, and it consists of the following parts.



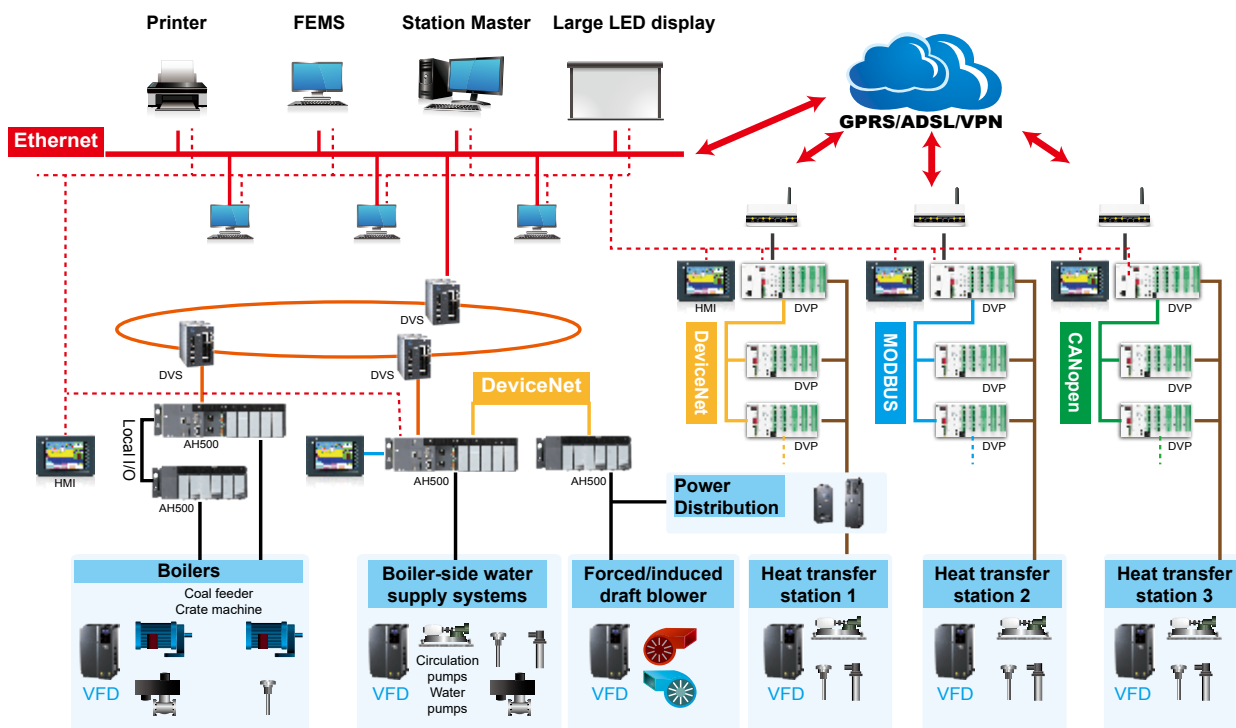
Heat Transfer Station

Heat transfer stations serve as the junction of pipelines from the central generating plants to the end users. It is where the heat is transferred from the primary to the secondary pipelines for adjustments of temperature, pressure and flow. The major equipment includes: plate heat exchanger, water pumps, control cabinets, water processing equipment, screening programs, water tanks, adjustment valves, meters for heat generation parameter adjustment and inspection, and devices that keep the water supply equipment from rusting or becoming encrusted.



Central Heating Solution

With depth of experience in power electronics, Delta provides a central heating solution that integrates Delta's programmable logic controllers, human machine interfaces, industrial fieldbus devices, and industrial Ethernet switches, providing optimal network openness, system safety and reliability, system integration and extension, and design utility.



► Device Layer

Provides Delta's C2000/CP2000 series control drives and APF/SVG/AFE series power quality products with a clean and stable power supply with reduced power risks.

► Control Layer

Provides DVP and AH500 series PLCs for small and medium range applications and DT series temperature controllers in a solution with versatile compatibility and a combination of master, slave and remote transmission modules that support protocols such as PLC Link, Ether Link, and MODBUS.

► Information Layer

Provides DVS series industrial Ethernet switches, DOP-B series high-end touch panel human machine interfaces, and IFD series industrial fieldbus solutions. Through the combination of e-Remote and e-Server software, users can conduct system monitoring data analysis and recording, remote transmission, trend reports and many other functions. Graphic software for configuration is also available.



Variable Frequency Control Solution for Blowers and Water Pumps

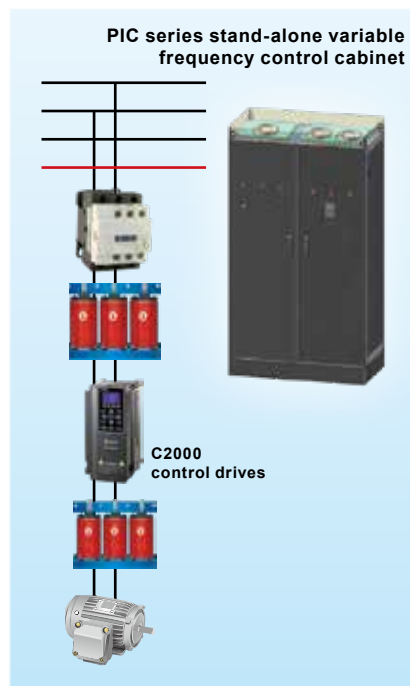
Delta's C2000/CP2000 control drives provide outstanding features and benefits for equipment such as water pumps and blowers, as listed below.

Advantages of Variable Frequency Operation:

- ▶ Reduces inrush current for automatic speed adjustment
- ▶ Avoids the impact of starting voltage to grids
- ▶ Protects the motors and peripherals to prolong lifespan
- ▶ Decreases noise interference to equipment during operation
- ▶ Provides flexibility and precision for equipment control

Benefits of Variable Frequency Operation for Blowers and Water Pumps

- ▶ Improves energy-saving efficiency significantly
- ▶ Reduces the amount of valves needed and simplifies pipelines
- ▶ Avoids the water leakage and energy loss caused by the increased pipeline pressure of traditional flow adjustment valves
- ▶ Lowers the pressure caused by the mechanics of blowers, water pumps, pipeline and ventilation channels.



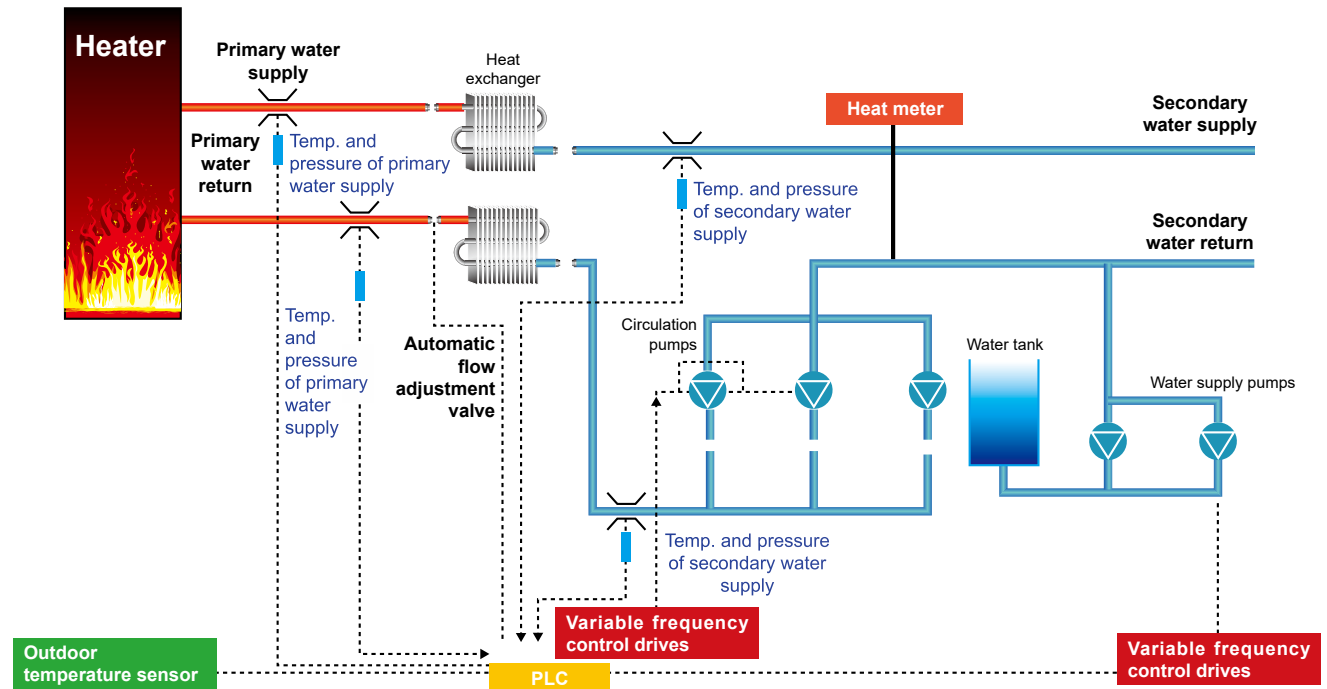
Delta's PIC series integrated solution of stand-alone variable frequency control cabinets include:

- ▶ Embedded C2000/CP2000 series control drives
- ▶ Support for multiple communication protocols including MODBUS for easy integration with various building control systems
- ▶ A simplified interface that provides clients with better service



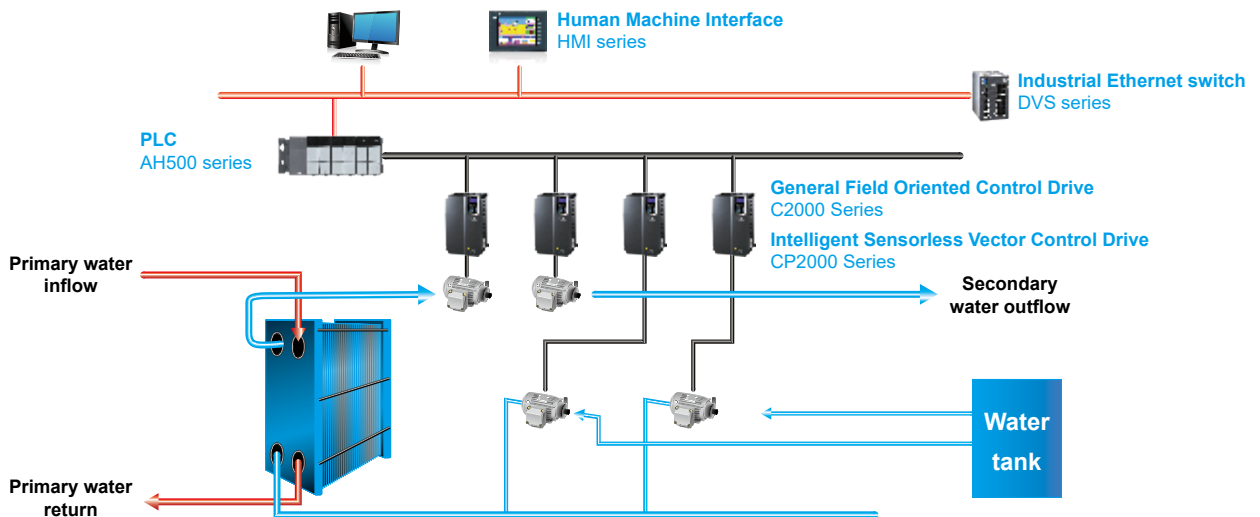
Perfect Automation Control

The combination of Delta's PLC control technology with C2000/CP2000 control drives provides perfect automation control for central heating systems.



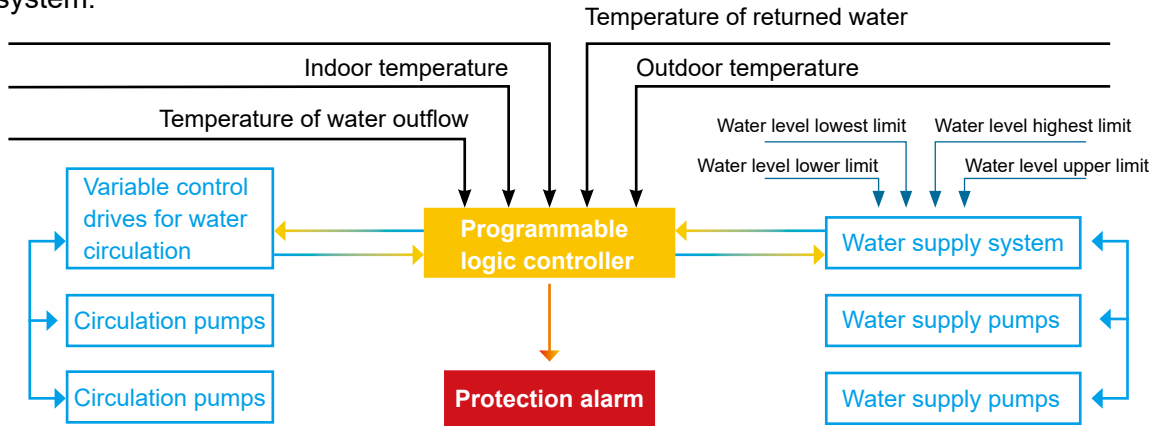
System Structure

The integration of SCADA, Delta's PLCs and C2000/CP2000 control drives makes possible the real-time control of the primary and secondary water pumps with DVS series industrial Ethernet switches for communication by MODBUS busbars. The heat transfer station consists of a heat transfer system of two heat exchangers, a water circulation system of two water circulation pumps, and a water supply system of two water supply pumps. The water circulation and supply pumps are both controlled by Delta's C2000/CP2000 control drives for variable frequency operation, and the status of the control drives are transferred to Delta's DVP series PLCs for further control signals.



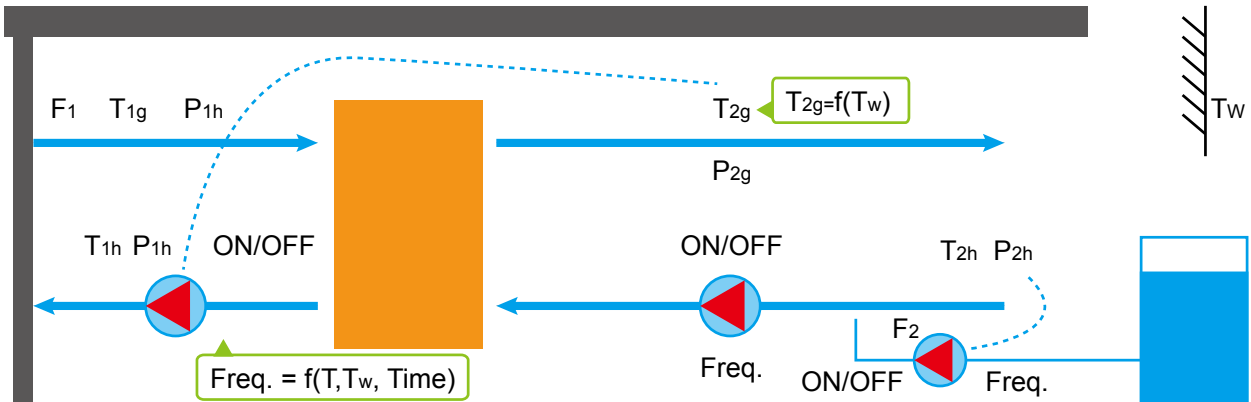
PLC Control

Based on pipeline signals for temperature, pressure, and flow, PLCs control the water circulation and supply system.



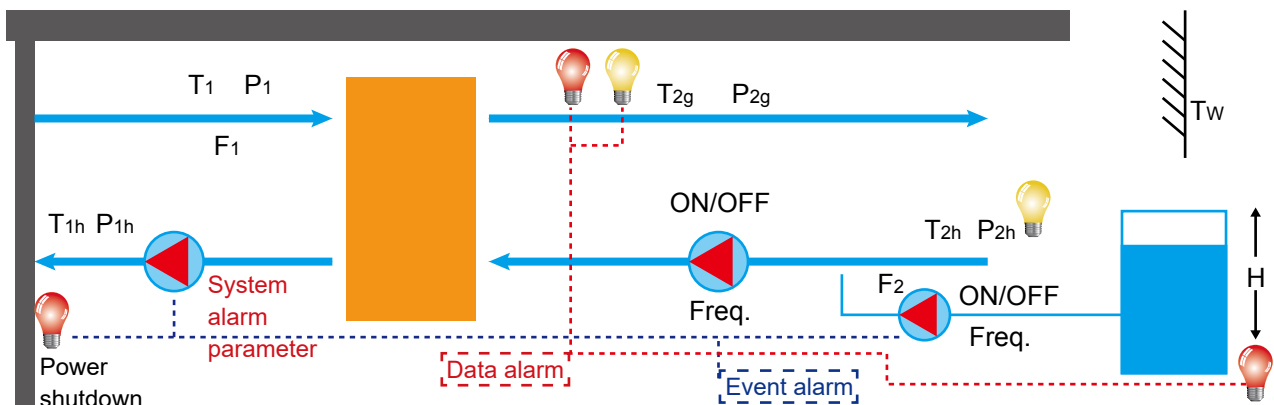
Flexible Heating Control

When the indoor temperature varies with outdoor temperature and causes a variation in heating requirements, the water temperature for secondary heat supply can be changed by adjusting the flow of the primary circulation pumps.



Alarm Control

Data alarm, event alarm



General Field Oriented Control Drive C2000 Series Intelligent Sensorless Vector Control Drive CP2000 Series



With our strong position in the industrial automation market, Delta's own brand AC Motor Drives have evolved rapidly. Each Drive series is designed to meet specific application needs. Our AC Motor Drives accurately control speed and torque, smoothly handle an increased load, and provide numerous custom control and configuration operating modes. Our AC Motor Drive product line provides a full range of motor control technologies and is used throughout a wide range of industries, to enhance and improve machine automation.

Industrial Ethernet Switch IES Series



Delta's Industrial Ethernet Switches feature enhanced hardware design, a user-friendly software interface, packet protection and compatibility with multiple industrial communication standards. With the advantages of high speed, high stability and high compatibility, Delta's Industrial Ethernet Switches help customers construct an industrial Ethernet system that will satisfy their requirements in a wide range of applications. All of Delta's Ethernet products are certified to UL, CE and FCC standards.

Programmable Logic Controller DVP Series and AH500 Series



Delta's Programmable Logic Controllers (PLCs) offer high-speed, stable and highly reliable applications in all kinds of industrial automation machines. In addition to fast logic operation, bountiful instructions and multiple function cards, Delta's cost-effective PLCs also support various communication protocols. Delta's line of industrial products offer a complete "Delta Total Solution" in the field of industrial automation control.

Human Machine Interface DOP Series



Delta's DOP series Human Machine Interface (HMI) provides various touch screens with multiple dimensions and colors. It also offers fast and convenient control functions for industrial automation machines. In addition, Delta Windows-based and user-friendly DOPSoft Screen Editor and Programming Software can configure the whole DOP Series. With DOPSoft, users can quickly edit images and graphs and easily set suitable communication protocols. Many applications can be created, edited, downloaded and uploaded.

Power Quality Solution

In today's metallurgy industry, people are demanding more reliable and stable power supplies with better quality. Power quality has become a key factor for power efficiency. To solve new power quality problems generated at metal production sites, buildings and server rooms, Delta has launched innovative new power quality solution to efficiently solve power quality problems and enhance the operation of metal plants with more efficient production and greater convenience. Delta's Power Quality Solution can gradually replace traditional capacitors to overcome the problems of voltage or current distortion, reactive power impact, and unbalanced loads.



**Active Front End
AFE2000 Series**



**Active Power Filter
APF2000 Series**



**Static Var Generator
SVG2000 Series**



Temperature Controller DT Series



Delta's DT series Temperature Controllers have fast output response, accurate PID parameter auto-tuning, support the MODBUS communication protocol and have various built-in output types, allowing different systems to quickly reach a stable control status. All series comply with international installation dimensions and CE, UL international safety approvals.

Industrial Fieldbus Solutions



Delta has developed numerous communication modules and solutions, which can be integrated into various combinations to meet the demands of complex and harsh industrial sites. These solutions offer high speed as well as stable and highly cost-effective choices for small to large system applications. For industrial automation applications of drive, motion and control, we provide general MODBUS RS-232, RS-422 and RS-485 serial communication modules, and offer advanced CANopen, DeviceNet, Ethernet, EtherNet/IP and PROFIBUS fieldbus solutions.

Industrial Power Supplies



The latest offering from Delta Electronics include the new DVP series, CliQ series, CliQII series, PMC series, and PMT series highly efficient and stable industrial power supplies. These products offer a nominal output voltage of 48V / 24V / 12V / 5V, a wide temperature range from -20°C to +75°C and a minimum holdup time of 20ms. The state-of-the-art design is made to withstand harsh industrial environments. The rugged, ultra-compact case material is shock and vibration resistant according to IEC 60068-2. The power supplies provide overvoltage, overload and thermal protection. The wide input voltage ranges from 85 to 264VAC (1 phase) and 320 ~ 575VAC (3 phase), and the multiple terminals are for fast wiring and easy installation.



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