



ABB SYSTEM DRIVES

# **DCT880, 20 to 4200 A** Thyristor power controller for industrial heating applications

# Overcoming decarbonization challenges

In the pursuit of a sustainable future, the reduction of carbon emissions in industrial heating stands as a critical goal. To address this challenge effectively, it is necessary to explore renewable energy solutions and their inherent benefits in limiting energy consumption. By recognizing the significance of this shift, we pave the way for a greener and more environmentally conscious industrial sectors.

Using electrical energy from renewable sources is only part of the solution. It is also necessary to enable the use of that electrical energy as efficiently as possible, especially in high-power applications.



Energy use



CO<sub>2</sub> emission

CO<sub>2</sub> emission reduction ● ————— ● Decarbonization



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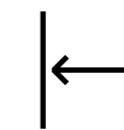
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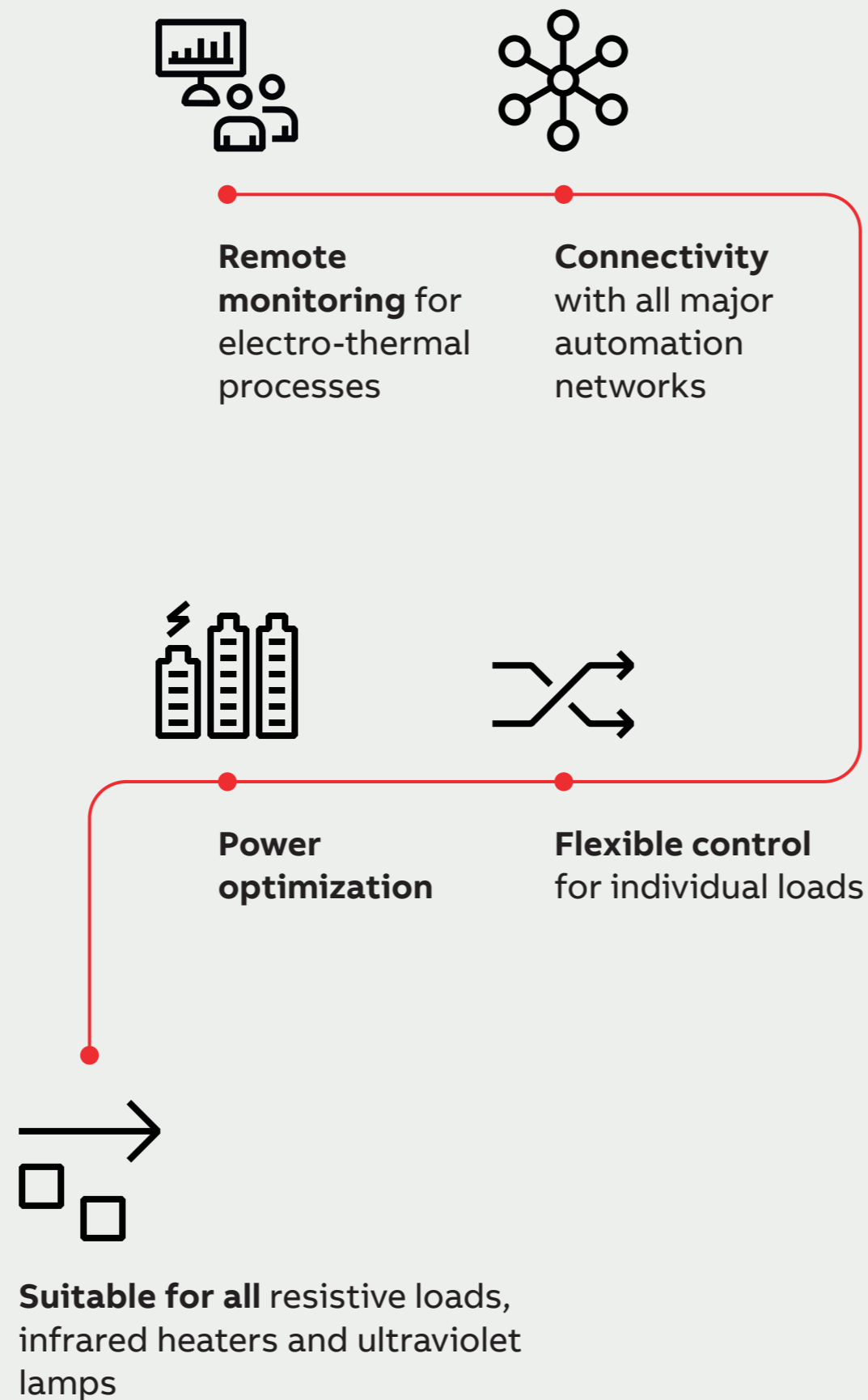
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# A smarter way to use energy

To provide precise heat control that leads to better end-product quality and reduced energy consumption, we have developed DCT880 power controller. Extremely accurate temperature control allows more effective production while consuming less energy. When allied to renewable sources of energy, the DCT880 provides further cost and energy savings.

Precise control of heat is necessary in various applications such as annealing, drying, melting, baking and many more. Automating this control helps ensure that exact temperatures are achieved, and that energy is used efficiently.

The DCT880 thyristor power controller utilizes proven ABB industrial technology and can be easily integrated into existing automation networks or can operate independently. The DCT880 comes with three independent process PID controllers (e.g., temperature control, current control, and power control). Furthermore, it has an integrated 3-phase current measurement system that accurately calculates and monitors the load resistance in the circuit, leading to better system performance. Additionally, the DCT880 can be ordered with a power optimizer feature which is an overriding function between the controllers that is shifting the single peak load in a series. This ensures that all devices feed the right amount of power at the right time and creates a continuous load as flat as possible on the primary side of the transformer.

# How our product can improve your efficiency

Many industrial heating applications consist of numerous heating elements that are located on the same site, but which may have different energy requirements and operation. With exact and independent heating control for different load configurations in any heating process the DCT880 ensures that the most demanding applications can be controlled efficiently and precisely.

The DCT880 offers an array of advanced technical features to make monitoring and optimizing power as simple and efficient as possible. The power controller is notably suitable for low to very high currents of up to 4200 A and is adaptable to different load configurations. All control modes are included as standard, ensuring flexibility to meet all kinds of heating requirements. Phase angle control provides dynamic heating for resistors with high  $R_{hot}/R_{cold}$  ratios and transformer loads. Full-wave control, or zero-crossing mode, is less dynamic for heating loads with a long thermal time constant. Half-wave control, alternatively, is used for loads with a very short thermal time constant, such as with infrared or UV lamps.

Single DCT880 can control up to three independent loads in a wide range of configurations. If there are more than three loads, one DCT880 acts as a master controller and the others as followers. The master controller performs optimization procedures for all following devices.



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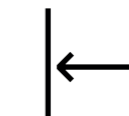
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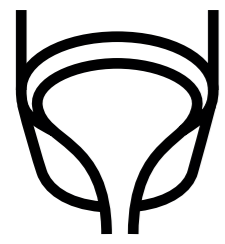
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# Decarbonization of industries and applications

## Comprehensive product



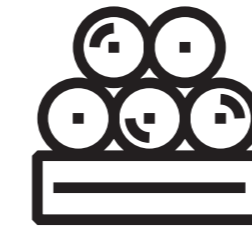
### Metals

Melting, tempering, annealing, wire rod heating, galvanization, coating, paint drying



### Glass

Melting, annealing lehr, heating the bath, boosting



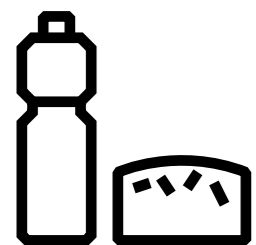
### Pulp and paper

Drying



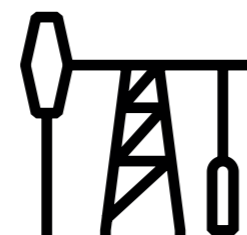
### Chemicals, plastics and pharmaceuticals

Electric boilers, trace heaters, carbonization (carbon fibre fabrication), immersion heaters, material preheating



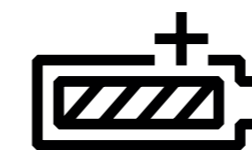
### Food and beverage

Baking oven, pasteurization, processing line-heating



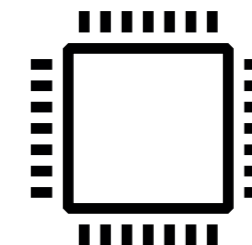
### Oil and gas

Downhole heating, pipe heating, e-fuel production



### Electromobility

Battery production



### Semiconductor

Photoresist coating (UV lamps), wafer fabrication



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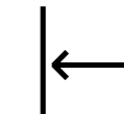
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# DCT880 main features

## Let's take a closer look

### Voltage and current classes

suitable for low and high current and voltage ranges.

### Advanced power optimizer

that reduces peak loads by optimizing the load balancing of multiple devices in parallel operation for up to 50 loads on a single line.

### All control modes

including phase angle control, full wave burst control (or zero-crossing mode), and half wave control, as standard.



### All load configurations in one product

including classic delta and star configuration resistor banks, open delta, single phase configuration with common or individual controls, the special multitap configuration, and more.

### Integrated load monitoring (true RMS) and support for different load types

including resistive load, infra-red, and ultraviolet.

### 3 independent PID controllers for process control

including temperature, power and current control as standard.

### 3-leg (W03) or 2-leg (W02) variants

offer precise control and current, voltage and power measurement for individual single phase loads or one common 3-phase load.

### Intuitive PC tool

providing effortless start-up and maintenance. Increased flexibility with adaptive and application programming features.



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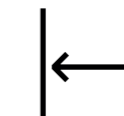
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# Unleashing the potential of DCT880 modules and cabinet solutions

The DCT880 system combines advanced modules with well-designed cabinets, optimised for a wide range of electric heating applications. It's a robust, seamlessly integrated solution to meet customer requirements.

The DCT880 modules showcase their excellence through seamless integration into the customer's own cabinets, ensuring high quality while maintaining a compact installation at minimal cost. For high-power applications, we offer an all-encompassing cabinet solution comprehensively designed by ABB, covering all essential components, to meet the most demanding requirements. Our product line presents an array of engineering options, granting clients the flexibility to address their specific needs.

Experience the superior quality, versatility, and reliability of DCT880 modules and cabinet solutions, as we elevate your industrial processes to new heights of efficiency and effectiveness.



## Why DCT880 power controller?

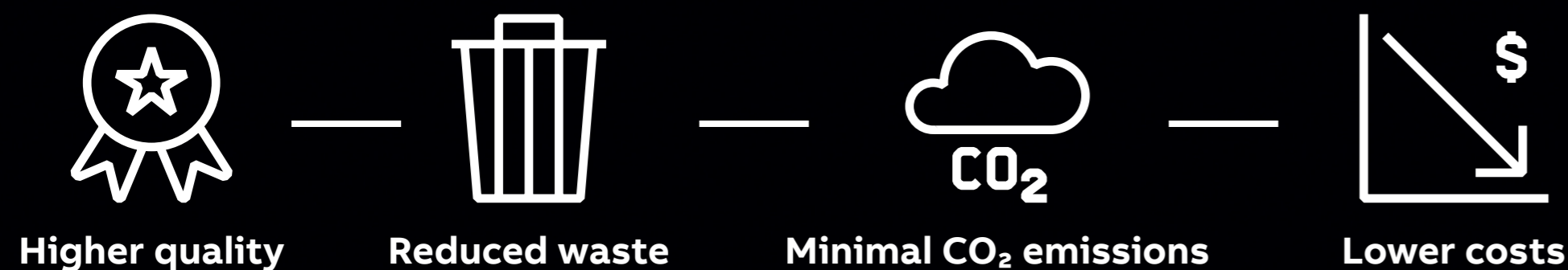
The DCT880 power controller presents a highly effective optimization solution that reduces process energy costs, leading to superior product quality in your heating applications. By choosing the DCT880 power controller, you equip your systems with a reliable, efficient, and customizable solution that not only optimizes energy consumption but also enhances overall performance, setting the stage for a future of excellence in your industrial heating processes.

With the DCT880 power controller, you can rely on ABB's proven technology, offering unmatched reliability. Our device offers exceptional current and voltage ranges reaching up to 4200 A and 990 V, respectively, granting precise control over different load types such as resistive or infrared heaters and UV lamps.

The DCT880 power controller supports various fieldbus communication options. Additionally, its capabilities can be enhanced based on specific requirements. You can choose from a wide range of fieldbuses such as PROFINET, PROFIBUS, EtherCAT, Ethernet, CANopen, and more, ensuring seamless integration into your existing systems.

ABB's DCT880 power controller offers an extensive selection of standard IOs. Moreover, it provides the flexibility to add a wide range of IO extensions tailored to meet unique needs. From individual modules to complete cabinet solutions, ABB delivers a comprehensive range of options to satisfy even the most demanding customer requirements.

By selecting the DCT880 power controller, you are empowering your heating applications with cutting-edge technology, superior performance, and unmatched customization possibilities to achieve optimal results in your industrial heating process.

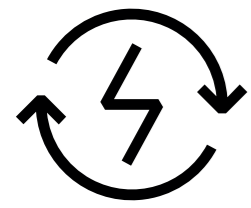


# Why choose the DCT880 thyristor power controller?

## Summary and key differentiators

### DCT880

Your power controller



#### Energy conversion

Effortlessly transform electric energy from conventional and renewable sources into industrial heating power



#### Industry 4.0 integration

Seamlessly integrate with Industry 4.0 through various interfaces, communication protocols, and a user-friendly control panel for enhanced energy efficiency in smart manufacturing



#### ABB Ability™

Leverage the power of ABB Ability™ for safer, smarter operations, maximizing resource efficiency, and contributing to a sustainable future



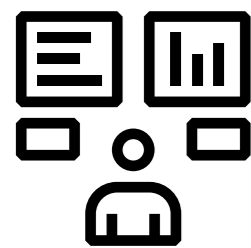
#### User-friendly interface

Easily integrated into ABB Service and logistic concepts for a streamlined user experience



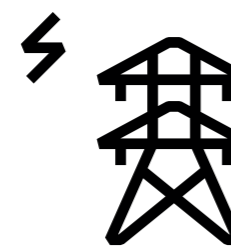
#### Proven reliability

Proven reliability ensured by time-tested technology, high-quality components, and highly qualified engineering



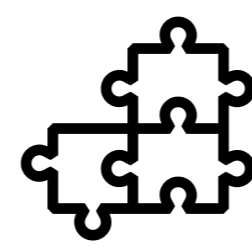
#### Advanced control

Independent measurement for each leg and customizable control options



#### Wide voltage classes

With voltage classes up to 990 V, it suits both low and high-current applications



#### Tailored solutions

Offers not only modules but also complete cabinet solutions tailored to the specific needs of customers



#### Partnership commitment

Benefit from global presence for customer support ensuring spare parts, service, consultancy and training worldwide



#### Power optimizer

Experience advanced power optimization, peak load reduction, automated master switching, and standard interface for enhanced performance



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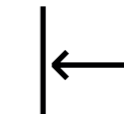
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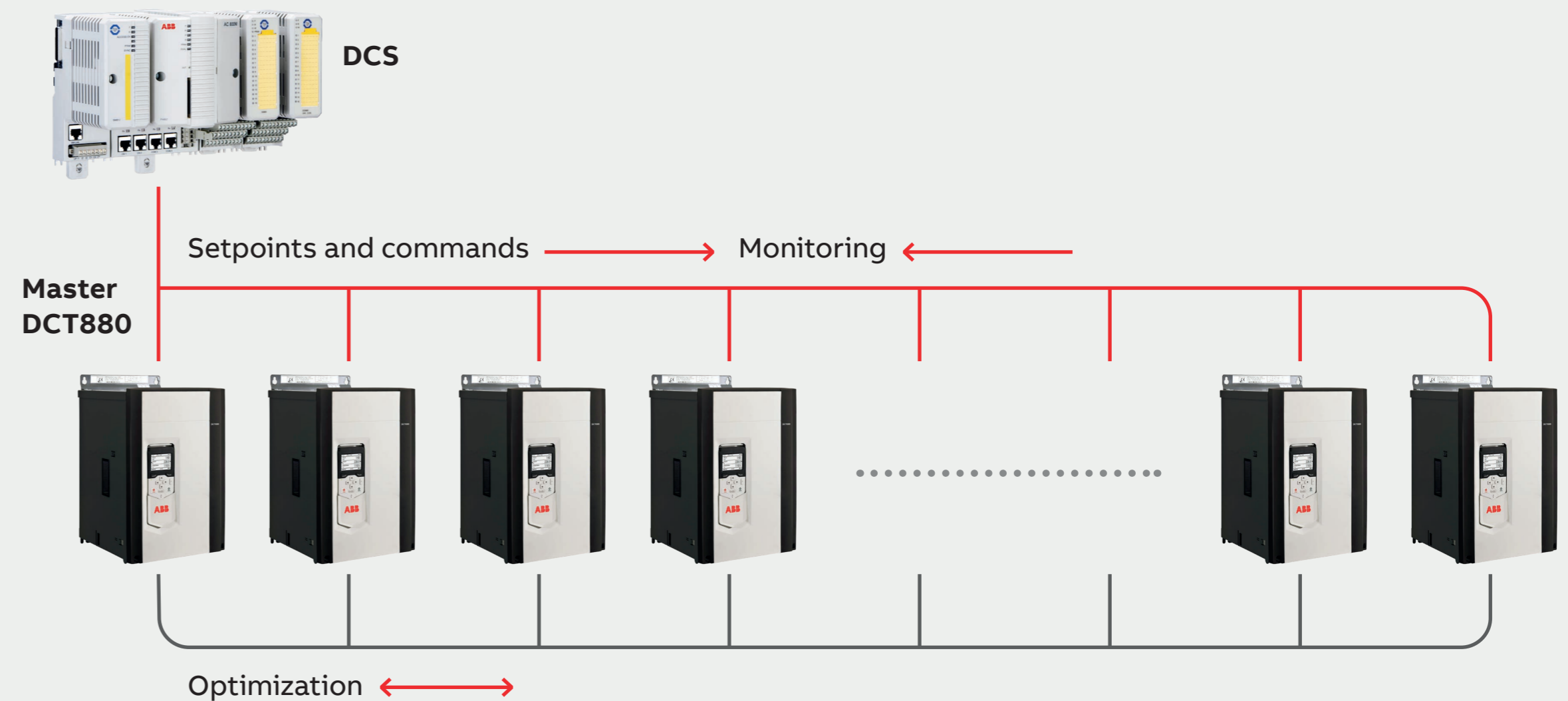
# Power optimizer for applications with multiple power controllers

Many industrial processes use large amounts of heat generated by electricity. This can be expensive, and even more if high peak power occurs. ABB's DCT880, equipped with integrated power optimization algorithms, mitigates costs by reducing peak power demands.

For industrial processes that use large amounts of heat, ensuring the efficient distribution of electrical power in heating applications is necessary to maximize possible energy and cost savings. This is especially true in case of applications with high peak power loads. The DCT880's power optimizer helps to save costs by reducing peak power demands using a micro time energy scheduling algorithm. This shifts the periods in which energy is consumed, without affecting the heating process.

The power optimizer is important for systems with several devices using full wave control, such as processing lines and industrial furnaces. It reduces peak loads by optimizing the load balancing of multiple devices in parallel operation for up to 50 loads on a single line.

How is this accomplished? The power optimizer ensures that all devices deliver the correct amount of power at the right time. It creates a continuous load as flat as possible on the primary side of the transformer.



## Customer benefits

- **Reduced peak power demand**
  - Reduced energy cost
  - Reduced installations cost
- **Easy to add option by memory unit (+S552)**
  - No additional hardware
- **Possibility for active load management**
- **Easy to use, no hard-to-understand tuning parameters**
  - Diagnostics signals of all followers in the master unit
- **Automated master switching. In case of a master unit failure, power optimizer functionality seamlessly transitions to another unit (follower), preserving this essential feature**



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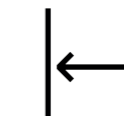
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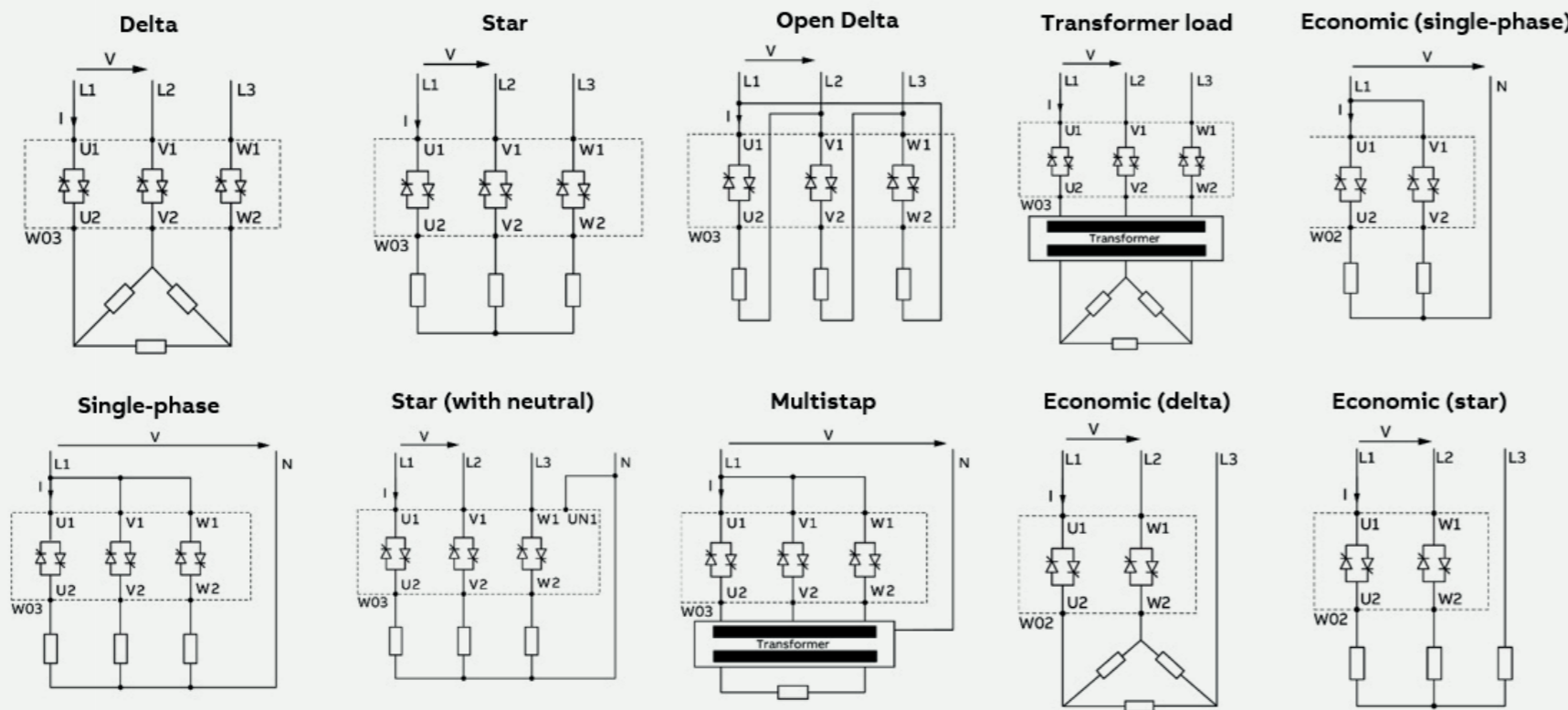
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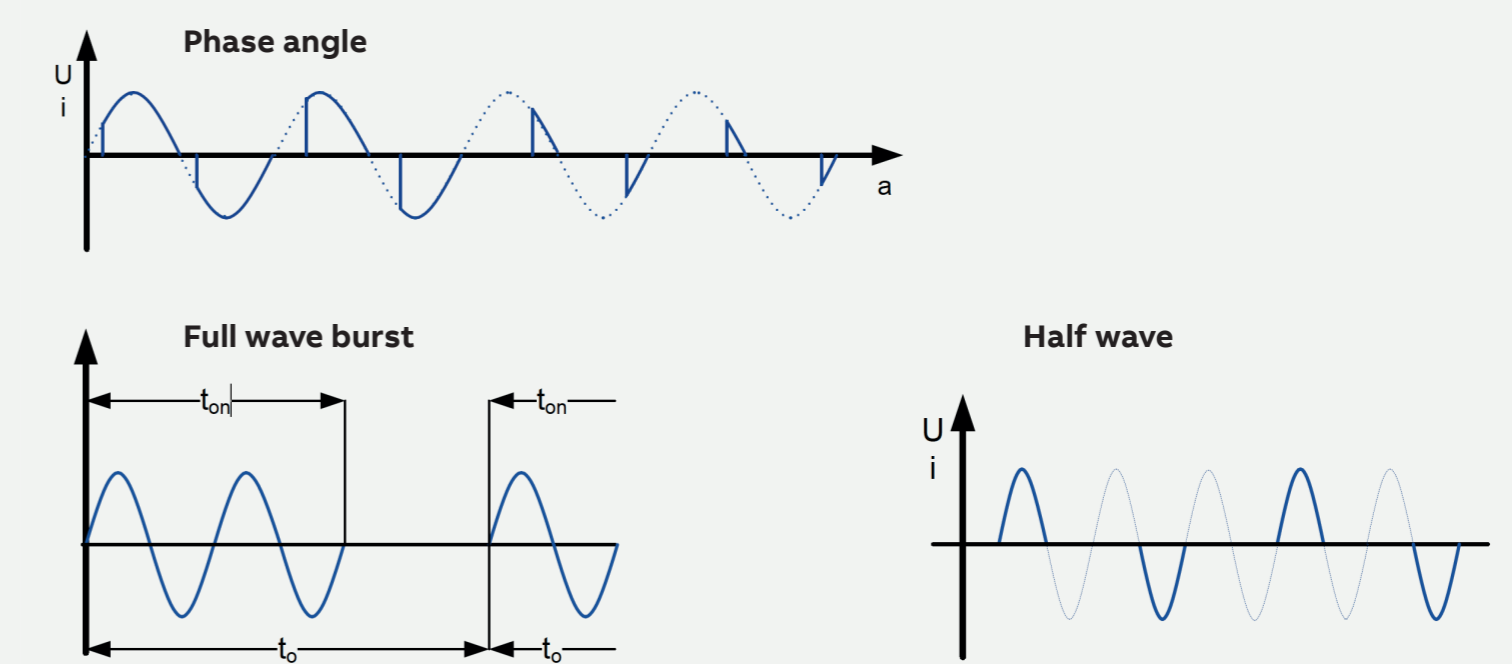


# Technical specifications

<b>Voltage range</b>	Up to 990 VAC
<b>Current range</b>	Up to 4200 A
<b>Power range</b>	14 to 5400 kW
<b>Supply frequency</b>	50/60 Hz ± 5%
<b>Operation temperature</b>	+40 °C (with rated AC current) +30 to +55 °C (with derated AC current)
<b>Storage temperature</b>	-40 to +55 °C
<b>Allowable relative humidity</b>	5 to 95 %, no condensation (at +5...+40 °C) 5 to 50 %, no condensation (at 0 ... +5 °C)
<b>Load configurations</b>	Single phase, Delta, Star, Transformer load, Multitap, Star with neutral, Open delta, 3 x single phase, 3 phase economic
<b>Load types</b>	Resistive, kanthal, infrared (IR), ultraviolet (UV)



<b>Legs</b>	W02: 2 independent single-phase loads or one 3-phase economic load W03: three independent single-phase loads or one 3-phase load
<b>Degree of protection</b>	IEC (IP00); UL (Open type)
<b>EMC</b>	EN 60947-4-3:2014
<b>Certification</b>	CE, UL508:2018, CSA22.2 No 14-2018, UKCA, EAC, RoHS
<b>Control interface</b>	6 x DI, 1 x DIL (DI for interlock), 2 x DIO (DI or DO), 3 x AI, 2 x AO, 3 x RO (relay output), 1 x MC RO (RO for main contactor)
<b>Fieldbus adapters</b>	PROFIBUS DP, CANopen®, EtherNet/IP™, Modbus TCP/RTU, PROFINET IO, EtherCAT®, PowerLink
<b>PC tools</b>	Drive composer entry tool, available for free via ABB website – <a href="#">click here to check</a> ; Drive composer pro tool
<b>Control modes</b>	Phase angle control, Full wave control (fixed/variable time base), Half wave control, U, U <sup>2</sup> (incl. open loop), I, I <sup>2</sup> , P, External Reference



# DCT880 hardware details

## Available variants



Unit size	Rated current $I_{AC}$ [A]	Supply voltage [ $V_{AC}$ ]									Dimensions h × w × d [mm]	
		W03 (3 legs)					W02 (2 legs)					
		110/230	400/525	690	800	990	110/230	400/525	690	800		990
T1	20	●	●				●	●				370.5 × 270 × 213.5
	35	●	●	●			●	●	●			
	55	●	●				●	●				
	80	●	●	●			●	●	●			
	100	●	●	●			●	●	●			
	125	●	●				●	●				
T2	160	●	●	●			●	●	●			370.5 × 270 × 269
	200	●	●				●	●	●			
	245	●	●				●	●				
T3	325	●	●				●	●				466 × 270 × 313
	360	●	●	●			●	●	●			
	420	●	●				●	●				
T4	550	●	●				●	●				669 × 270 × 352
	630			●					●			
	675	●	●				●	●				
	740	●	●				●	●				
T5	890	●	●	●								740.5 × 270 × 368
	960						●	●	●			
T6	1300	●	●	●			●	●	●			1200 × 468 × 431
	1750	●	●	●			●	●	●			
T8*)	2100	●	●	●	●	●						2120 × 2430 × 644
	2700	●	●	●	●	●						
	3200	●	●	●	●	●						
	3900			●	●							
	4200	●	●									

\*) Available as cabinet only

# Drives and Controllers

## Empowering your business, with profitable and sustainable efficiency

You base your business on efficiency and performance, understanding that every aspect contributes to your competitiveness. Our drives and power controllers, like DCT880 are designed with this core principle in mind, aimed at enhancing productivity and efficiency. We offer flexibility to help optimize your processes and provide reliability to minimize downtime, along with premium services and expertise available worldwide.



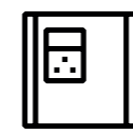
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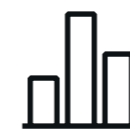
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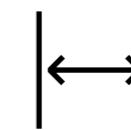
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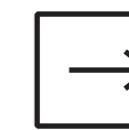
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