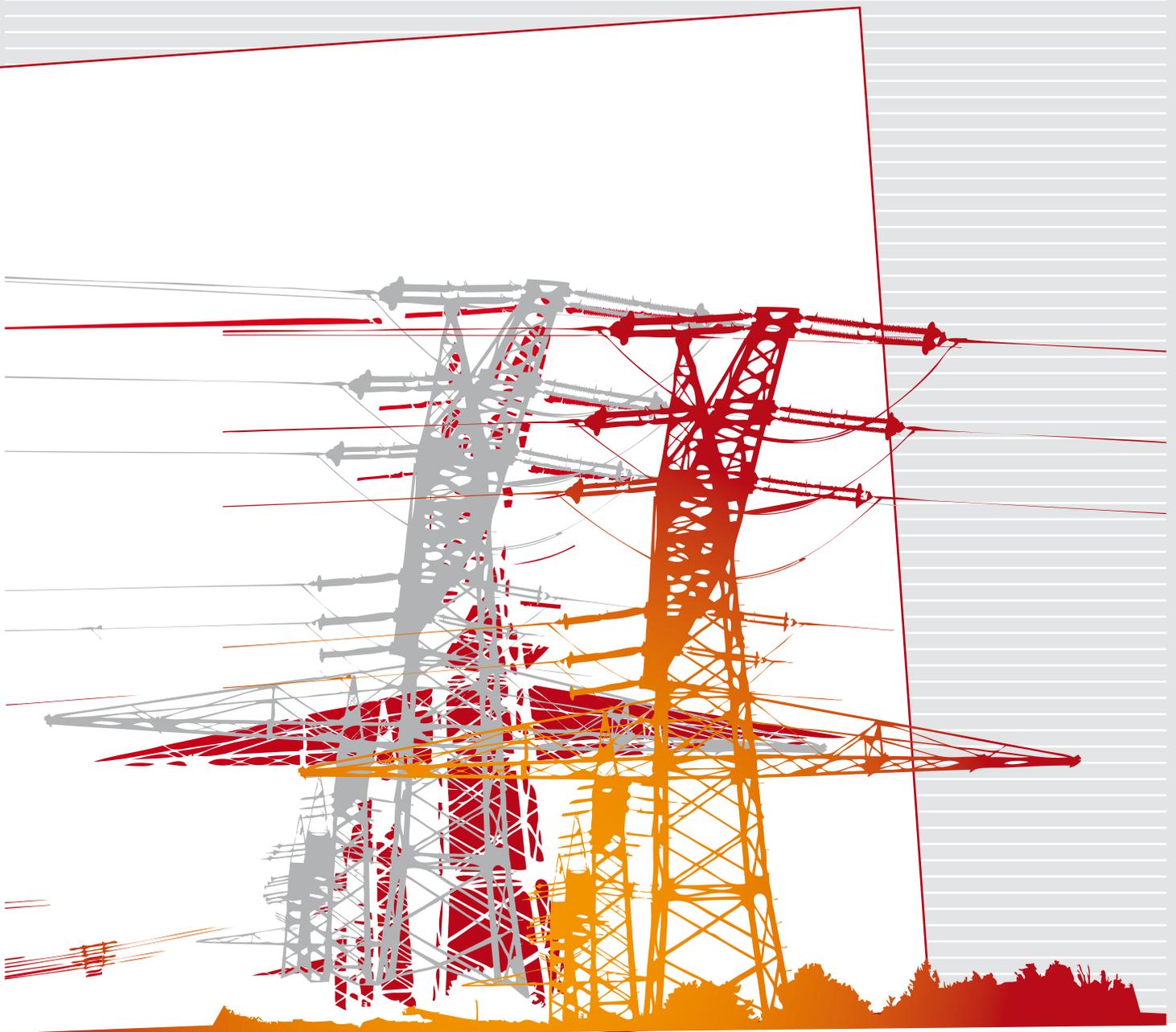


# PADICON®

**Manage energy consumption – reduce costs**  
Optimising the operation of induction furnaces



# The optimisation system for energy costs ...

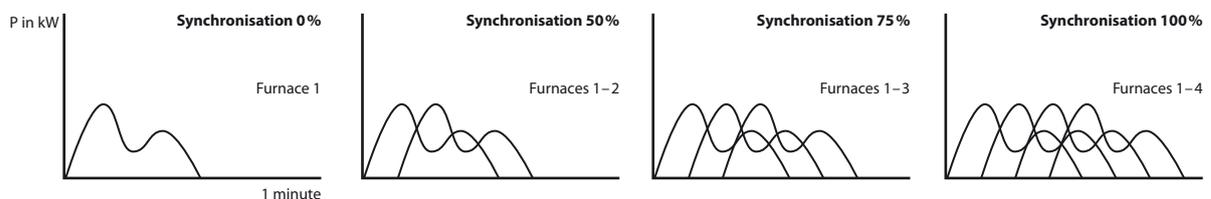
## The problem: energy and energy costs

Energy costs are rocketing, affecting an increasing number of manufacturing companies. Because of their high energy requirements, foundries, especially, are often under cost pressure. The price for electrical power in large companies is made up of two components: firstly, the price of the electrical energy used, which makes up around 55 per cent, and secondly the demand charge, which weighs in at around 45 per cent. The amount of electrical energy used cannot easily be changed in the short term, but the time it is required can. Energy-based production planning can avoid cost-intensive consumption peaks.

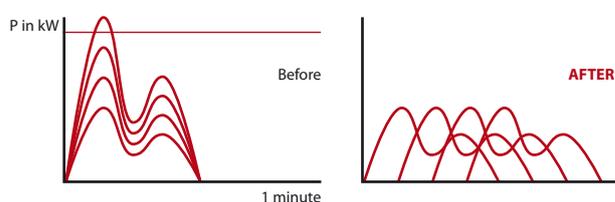
## The solution: PADICON® – the Parallel Difference Power Control

PADICON® can be integrated into your energy management system and is suitable for medium- and mains-frequency furnaces. The process records the demand and power consumption and saves the data. As the work processes are repeated, a characteristic curve is built up. Based on this curve, the process controller synchronises all the furnaces' separate cycle times to create a balanced load profile with no peaks in consumption. Thus, work processes with high power consumption no longer take place independently, but are harmonised. Peaks and troughs in demand are balanced out against one another. Until now, production planning and control systems have not displayed the power consumption. However, power consumption is a consistent figure which can be used to make processes transparent.

### Harmonising amplitude, taking four medium-frequency furnaces as an example



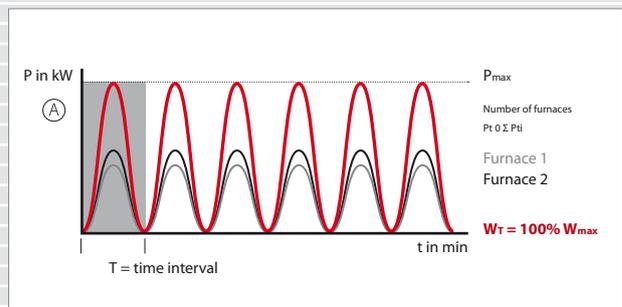
*PADICON® always optimises the maximum possible spread of the parallel technological process.*



*When all four furnaces are operated in parallel, peaks in demand are avoided thanks to harmonisation.*

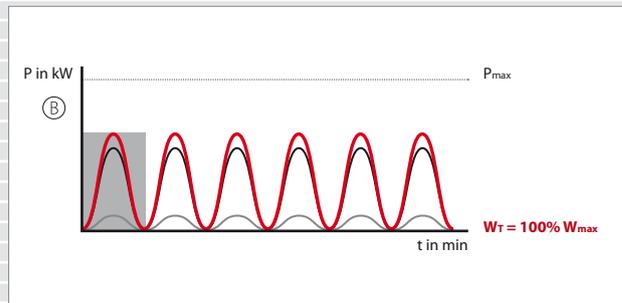
## Without energy management

When two or more furnaces consume energy in a random manner, individual subprocesses can often overlap, leading to peaks in demand, especially at busy times. This can have a negative effect on a company's energy budget, and determines the demand charge due across the year as a whole.



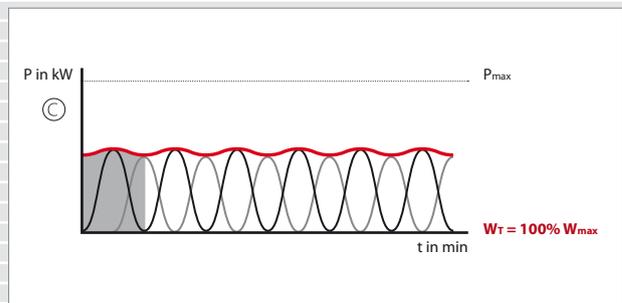
## Conventional systems

Conventional power control systems work according to the limit principle. When the maximum demand is reached, a furnace is shut down to a technical minimum load. This "full speed and brake" principle disturbs work processes and results in a considerable loss of melting time.



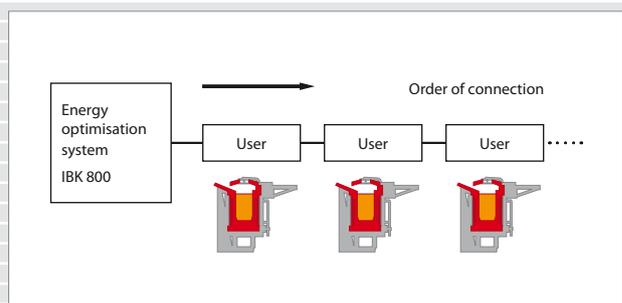
## The innovation: PADICON®

PADICON® replaces the old, rigid load limitation method with a smooth, process-oriented, adaptive control system. Using an internal trend processor, PADICON® saves the process data and continually calculates the expected total load. The furnaces are controlled so that the peaks in demand do not even occur. The result: greater melting capacity with lower energy costs.



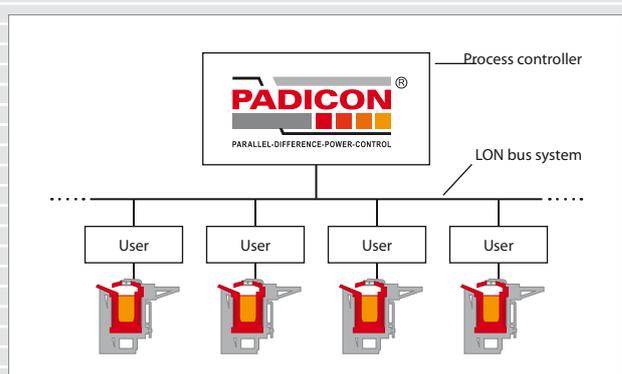
## Conventional serial connection

When the maximum demand is reached for individual furnaces, conventional systems disconnect them entirely for several minutes, in series, and then connect them up again. The result of this procedure is that for the first furnace in the series to be disconnected, the melting times rise noticeably.



## Optimised parallel connection

PADICON® does not disconnect furnaces in series, but merely reduces their demand simultaneously for a brief time using an intelligent process control system. To reduce the power consumption in the short term, the demand curves are synchronised. The reduction is hardly noticeable and leads to an almost imperceptible lengthening of the melting process.



# ... to make your energy budget positive!

## Reduce costs but not performance

With the PADICON® process, the system harmonises itself. As the load is no longer shed, the melting process is not disturbed, meaning the furnaces are subjected to a lower thermal and electrical load. This increases their durability and decreases wear. Electrical energy is drawn from the mains constantly, so there are no impact loads. This means that all the furnaces can be run simultaneously with a constant overall power intake. Furthermore, as the power amplitudes of various processes are synchronised, this can make it unnecessary to install a new transformer, saving considerable investment. Parallel, differential control keeps energy costs low. Because of the high potential saving (10 to 20 per cent), the initial costs for PADICON® are paid off after just one or two years.

All process data are recorded, meaning PADICON® provides a precise overview of all work processes. As well as the current power consumption, the system also records the melting temperature, weight and alloys. The demand curve and power consumption of every single melting furnace are recorded and stored. A real-time display, accurate to the nearest second, allows the process to be tracked in detail and thus provides a consistent analysis of the process organisation.

## Your advantages at a glance

- Save energy costs: 10 to 20 per cent
- Constant demand
- Higher melting capacity: up to 10 per cent higher
- Improved performance without installing new transformer
- Make work processes transparent
- Raise capacity of all processes
- Improve continuity of operating processes
- Pays for itself within one or two years
- Track processes precisely with real-time display accurate to the nearest second:  
Who is working how hard and how long?
- Unerringly records errors in process organisation



## Protected

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The PADICON® process is under brand and utility patent protection: it has been registered as a patent with the German Patent and Trade Mark Office.



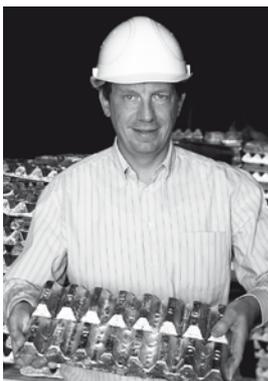
## Tested

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TÜV Rheinland testing association confirms that PADICON® achieves 14 per cent higher savings than with conventional energy optimisation systems.

## The best reference: satisfied customers

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“By using PADICON® we have been able to reduce our peak power consumption from six to five megawatts – with no change in the amount manufactured. With a demand charge of EUR 100 per kilowatt, with PADICON® we have thus been able to save EUR 100.000 every year. The process has also had an interesting additional affect: the extensive documentation means that every unit can be evaluated separately. This means that the specific energy costs for each alloy can be established. This information is very important for the purchasing and controlling departments.”

*Luc Van Oostveldt, head of IT / Finances, Affilips N.V.*



“Using a conventional system to monitor peak loads, we managed to limit our peak power consumption to 23.000 kilowatts. In 2006 we installed a new energy management system: PADICON®. This has meant we have been able to extend the performance while simultaneously actually reducing the peak load to 21.000 kilowatts. We have even managed to maintain this figure after putting an extended holding furnace into service. Installing PADICON® has really been worthwhile for our company and the initial costs have already paid for themselves.”

*Uwe Junghans, head of operations and maintenance at Flender Guss GmbH*

## Funded

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The development of the PADICON® process was funded by the Federal Republic of Germany and the federal state of Brandenburg.

# Corporate portrait of Dr. Tanneberger GmbH

## The company

Dr. Tanneberger GmbH is the only company to provide scientific methods, patent registration, TÜV inspections and its own hardware development from a single source. In particular, our engineers are well-versed about manufacturing processes involving energy-intensive transmutations.

We work in close cooperation with scientific institutions such as the Fraunhofer Institute and Bergakademie Freiberg university. Furthermore, the various projects integrate sworn experts, specialists and professionals involved in the different processing techniques and technologies.

Dr. Tanneberger GmbH was founded in 1992 and deals with energy control systems in the broadest sense, and in particular with process engineering for energy optimisation.

## Our customers

Flender Guss GmbH, Klaus Kuhn Edelmetallgießerei GmbH, Affilips V.N., Gießerei und Glasformenbau Radeberg GmbH, SHB Bösdorf GmbH, KM Europa Metal AG, Sakthi Neunkirchen, Eisenwerk Hasenclever & Sohn GmbH, Meuselwitzer Guss Eisengießerei GmbH, Technoguss Tangerhütte GmbH, SLR-Gusswerk II Betriebsgesellschaft mbH, EFS Elbe-Stahlwerke FERALPI GmbH, EURO GUSS GmbH, Fritz Winter Eisengießerei GmbH + Co. KG, Walzengießerei Coswig GmbH, Edelstahlwerk Schmees GmbH, Jürgens Gießerei GmbH & Co. KG, GKN Walterscheid Getriebe GmbH, Schlösser Armaturen GmbH & Co. KG, Finow Automotive GmbH, Trompeter Guss GmbH, BGH Edelstahl, Kinon Porz GmbH, Halberg Guss Leipzig Produktions GmbH & Co. KG, AGR Aluminium Gießerei Rackwitz GmbH, VTN Härterei Wilthen, ES Automobilguss GmbH Schönheide and many more.

## Contact details

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