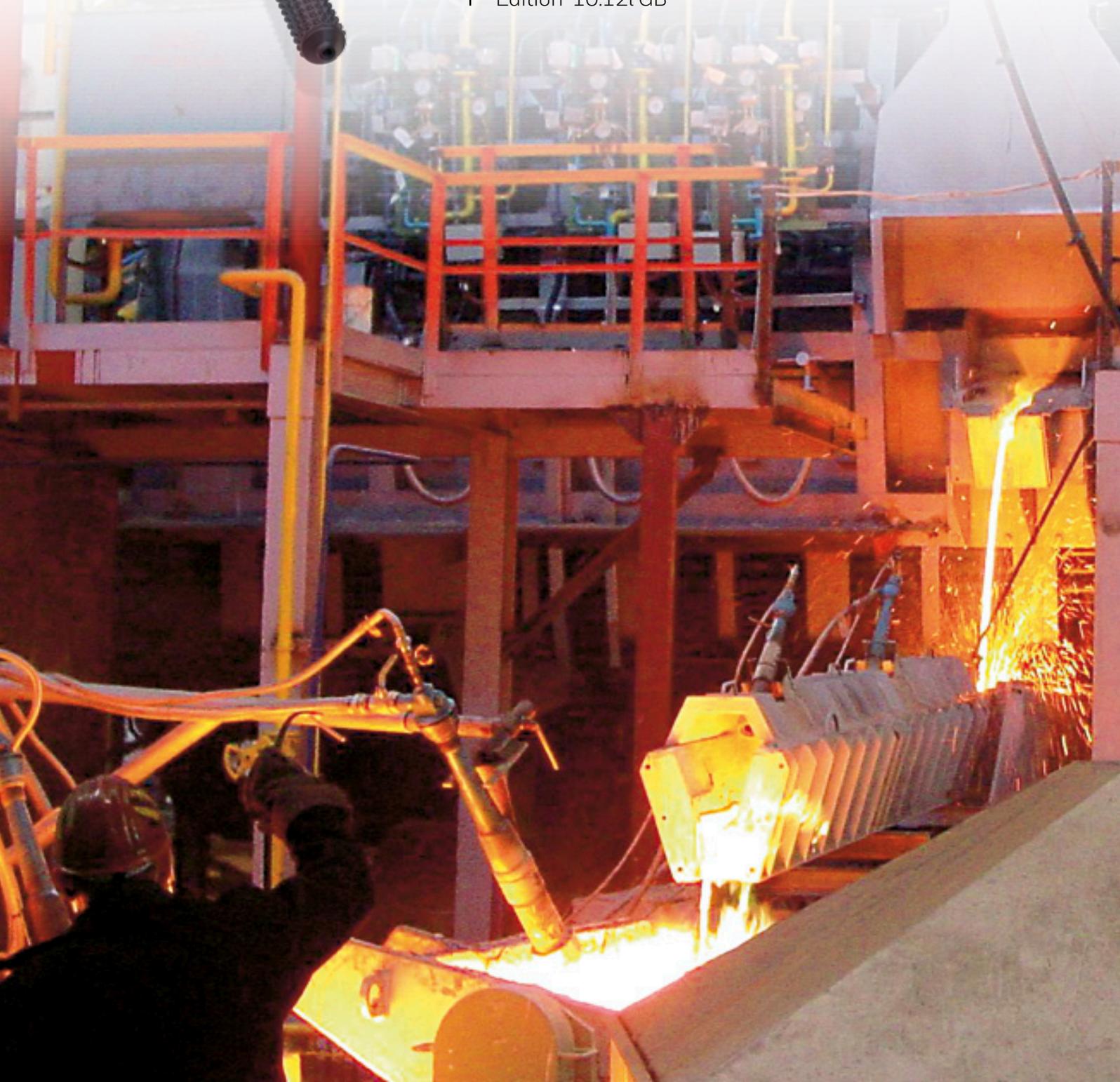




Increased efficiency for melting,  
heating and heat treatment

## Gas-fired processes in the metalworking industry

Edition 10.12| GB



# Metalworking industry

## We control your furnaces and your success!

Honeywell Kromschröder products for industrial heat treatment processes combine energy efficiency, maximum safety and availability as well as an optimum price/performance ratio resulting in tailor-made solutions for the metalworking industry.



*PartDetective spare  
parts DVD*



*ProFi product finder DVD  
with Docuthek*



*Smelting furnace, Zollern Foundry works photograph*

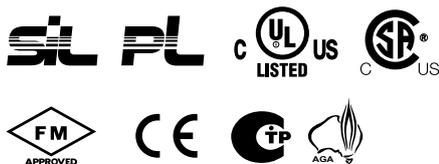
## What counts in a competitive world are the facts!

Our product range for firing technology has a modular structure. Thanks to this modular system, you will benefit from functional and logistical cost benefits.

Honeywell Kromschröder systems are a key cost-cutting factor because they are easy to assemble and install. Commissioning procedures are accordingly short and straightforward. We also offer a special range of training courses for various customer and product groups, should you require extra support. Our competent Service Team is also there to help.

Safety first. Honeywell Kromschröder gas safety and control systems comply with the requirements of standards and regulations in order to provide your operating personnel with optimum protection. This also applies for the current requirements to SIL/PL.

High system availability is the prerequisite for cost-effective operation. The design and robust construction of the Honeywell Kromschröder firing systems ensure a long service life of your installation.



*Bell-type furnace, LOI works photograph*



*You can access comprehensive technical information, operating manuals, animations and price lists, etc. in our document library at [www.docuthek.com](http://www.docuthek.com).*

[www.kromschroeder.com](http://www.kromschroeder.com)  
[www.docuthek.com](http://www.docuthek.com)

When modernizing or expanding existing systems, the modular design of our product range proves to be of decisive advantage since it means that individual system components can be easily retrofitted or replaced.

Preventive maintenance minimizes the risk of faults and downtimes. For this reason, our Service Team can offer you individually tailored maintenance contracts.

We are making our contribution to environmental protection with resource saving production and a high degree of reusability of every component.



*Honeywell Kromschröder  
electrical systems engineering*

**We are prepared for any questions our customers may have and always have a solution at the ready**

**Does your production process require homogeneous temperature distribution throughout the furnace chamber?**

Then Honeywell Kromschröder impulse burners are the best solution. The top-quality high-speed burners ensure optimum mixing of gas and air.

**Does your process require a defined furnace atmosphere?**

Our extensive product range offers system solutions for staged or continuous lambda adjustment or lambda control. The time-tested pneumatic ratio control system thereby ensures that no dangerous excess gas occurs.

**Would you like to be able to use the gas type of your choice?**

All Honeywell Kromschröder systems are suitable for town gas, natural gas and LPG. In addition, we can supply a large assortment of reliable gas controls and burners for sewage gas, landfill gas, biologically produced methane, generator gas and coal gas.

**Are you concerned about not wasting energy?**

The heat in the flue gas can be supplied to the burner by directing it through heat exchangers in order to raise the temperature of the combustion air. Honeywell Kromschröder can provide the necessary control valves for gas and air.

**Do you want to make use of every opportunity to increase efficiency?**

Burners with integrated recuperator from Honeywell Kromschröder allow an energy saving of up to 30 % due to air preheating up to 700 °C. They are used for direct heating or in conjunction with single-ended radiant tubes for indirect heating of furnace systems.







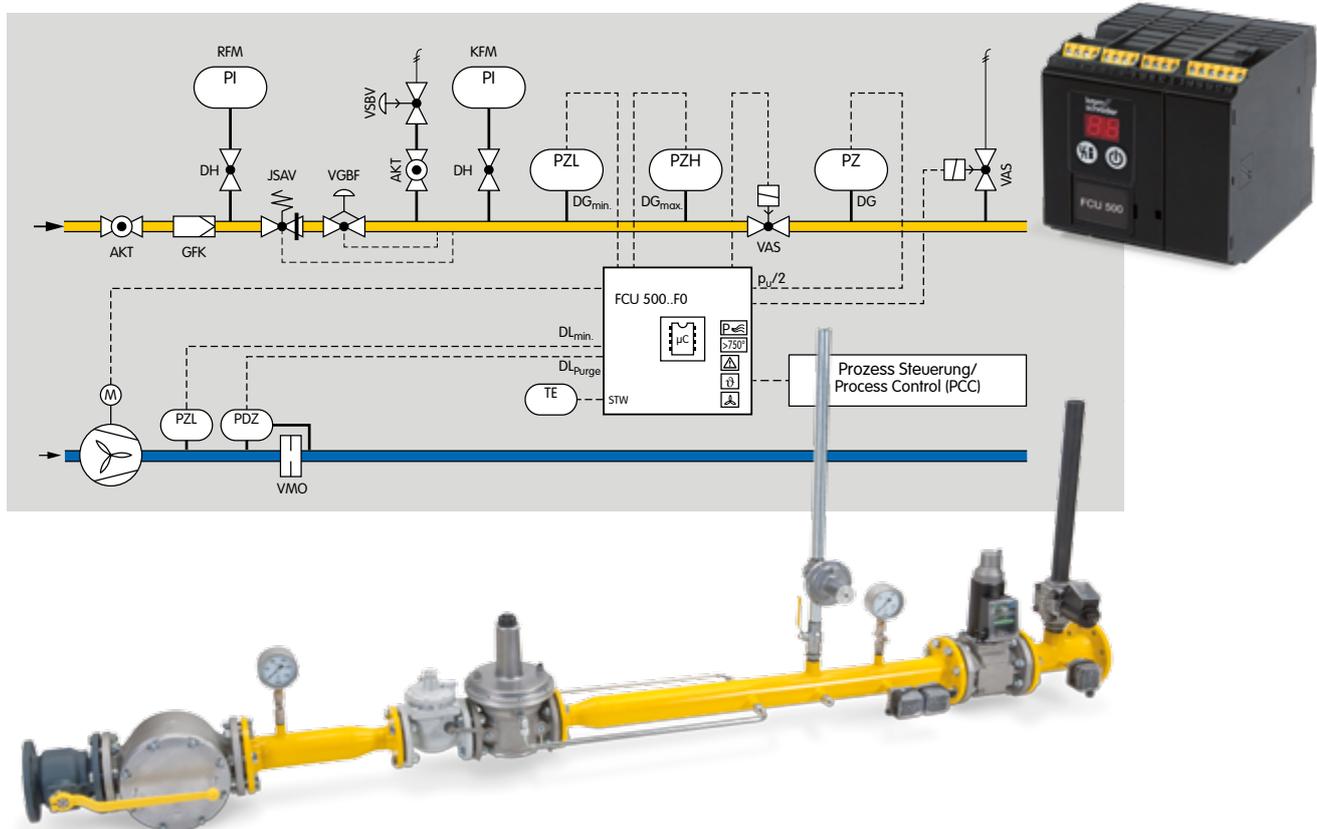


Heat treatment furnace in South Korea

## Gas pressure control and safety line as a system solution

We provide complete solutions with pre-assembled gas safety, measurement and control systems to EN 746-2 for the gas distribution system on industrial thermoprocessing installations with downstream burner systems. Here, all the individual components are perfectly coordinated. The solutions are designed to strictly comply with current standards and regulations.

The protective system control FCU 500 monitors and controls the central safety functions of Gasmin, Gasmax, Airmin, pre-purge, tightness test, high temperature operation or start enable for burner control units in multiple burner systems.



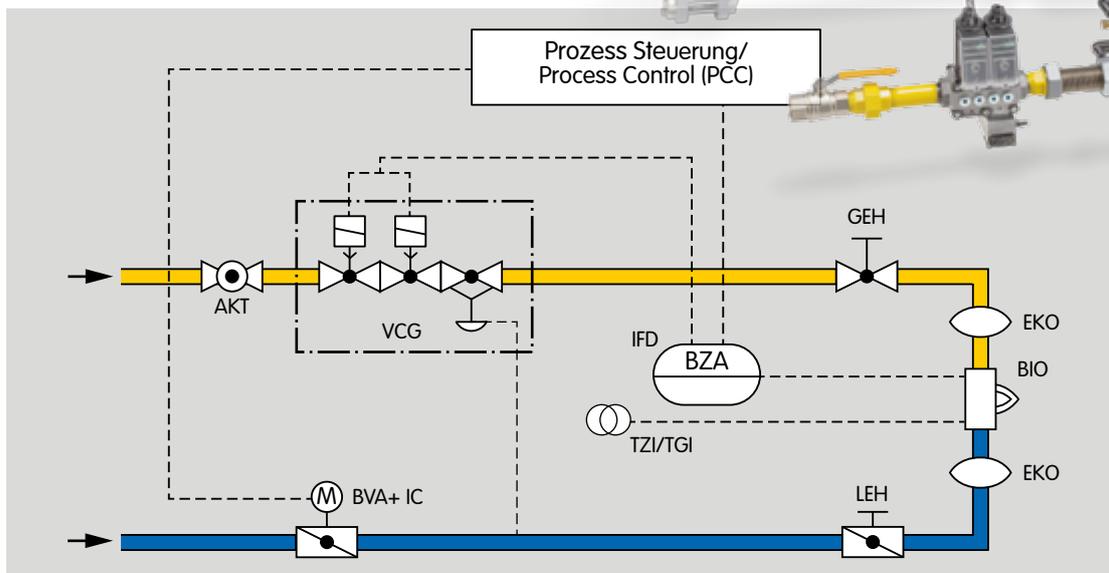
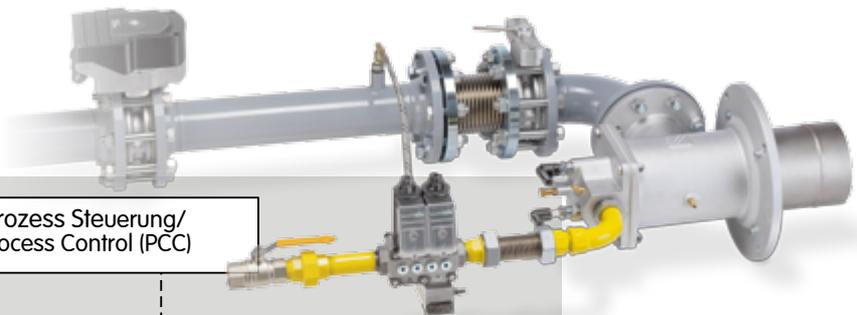


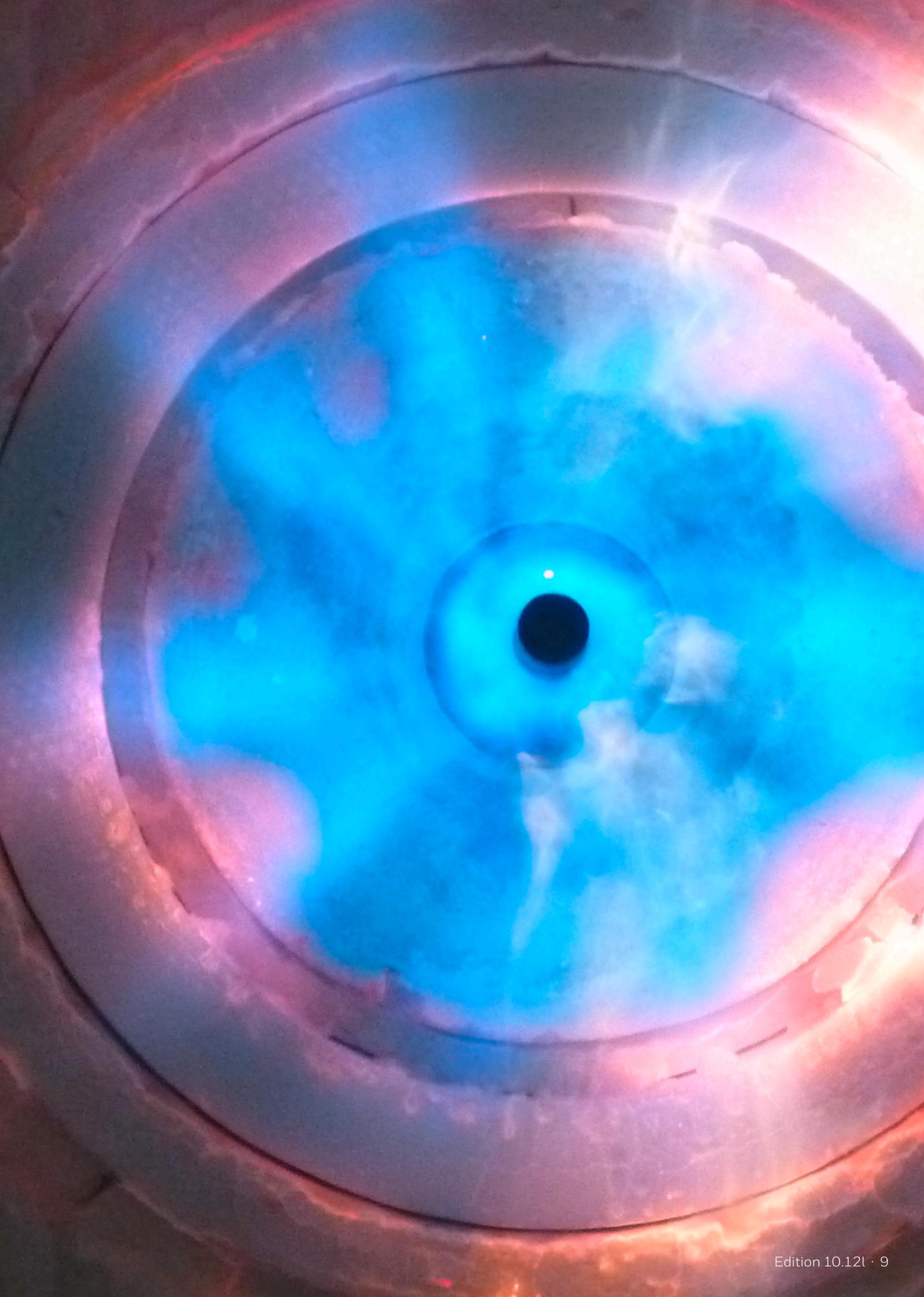
*Copper smelting furnace,  
ANDRITZ Maerz works photograph*

## Continuously controlled heating system with cold air and pneumatic ratio control system

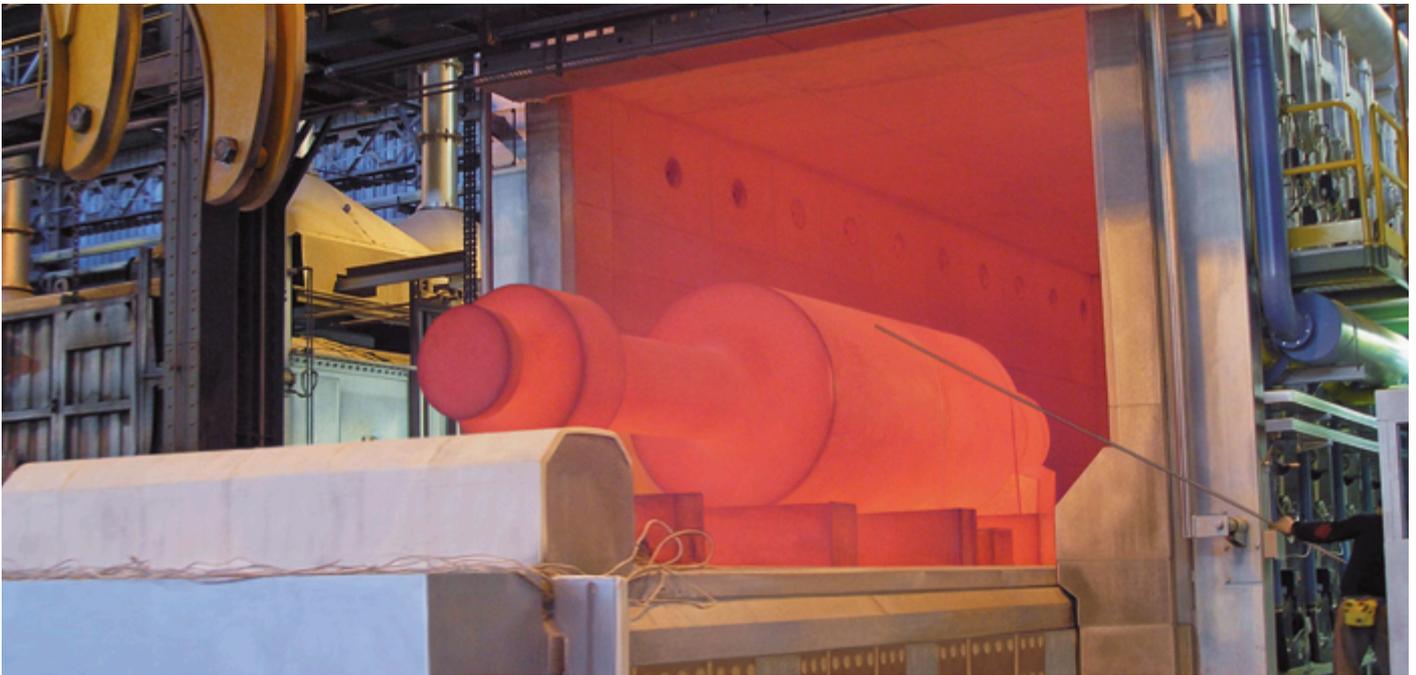
Modulating control is a cost-effective option for controlling processes. The capacity can be adjusted continuously by activating the air control valve (analogue or 3-point step signal). The pneumatic ratio control system controls the gas pressure proportionally to the air pressure and thus maintains a constant gas/air ratio. At the same time, it acts as an air deficiency cut-out. Adjusting valves and/or butterfly valves are used for limiting the air and gas volumes and for adjusting the gas/air ratio.

Furnace pressure fluctuations have the same effect on the gas and air throughput so that the gas/air ratio will remain unchanged. Ignition and monitoring are ensured by an automatic burner control unit which is approved for continuous operation if the burner is to operate for more than 24 hours, in accordance with EN 746-2.







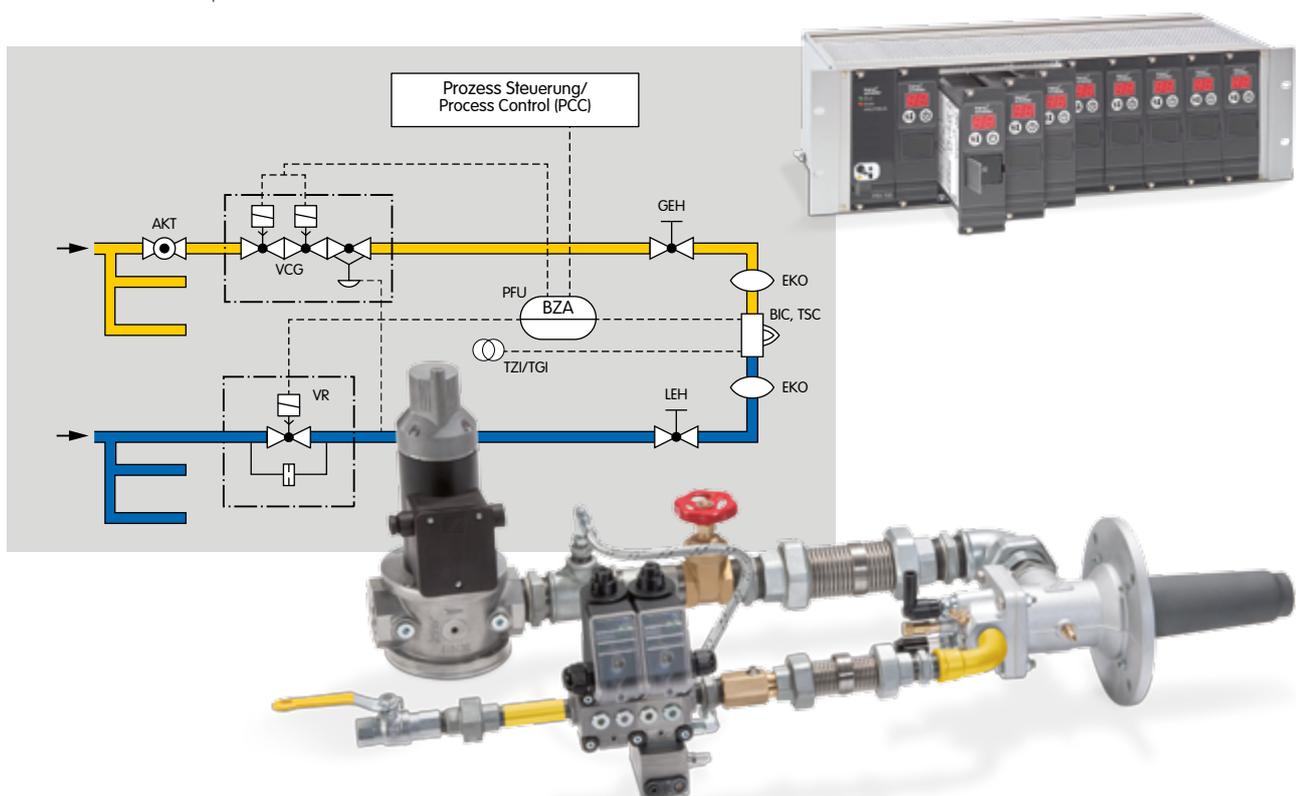


*Bogie hearth furnace,  
Technocentro works photograph*

## Stage-controlled heating system with cold air and pneumatic ratio control system

Staged control with rotary impulse control is an optimal solution for systems requiring a large control range. In the case of cyclical control, the burners are switched on and off or are controlled in High/Low mode. The capacity supplied to the process is controlled by means of a variable ratio of the operating time to the pause time. In this type of control, the burner output pulse frequency always maintains full momentum and maximum convection is obtained in the furnace chamber, even with low capacity supply. This ensures uniform temperatures in the furnace.

Automatic burner control units with air valve control allow pre-purge as well as cooling via the burners which is controlled by the impulse system. Two valve outputs on the automatic burner control unit for separate activation of the bypass valve and main valve ensure the fail-safe limitation of the start fuel flow rate in accordance with EN 746-2. The air supply can also be controlled in two stages using smart air control valves so that a defined gas/air ratio prevails in the burner in all operating states.





*Commissioning a furnace with BCU and Profibus DP connection*

## Stage-controlled heating system with menox low NOx burners

On the basis of the time-tested BIC series, Honeywell Kromschroder has developed the new low NOx solution, menox®. This combines the low-cost, simply structured burner BIC..M with simple control technology allowing to switch between two operating modes:

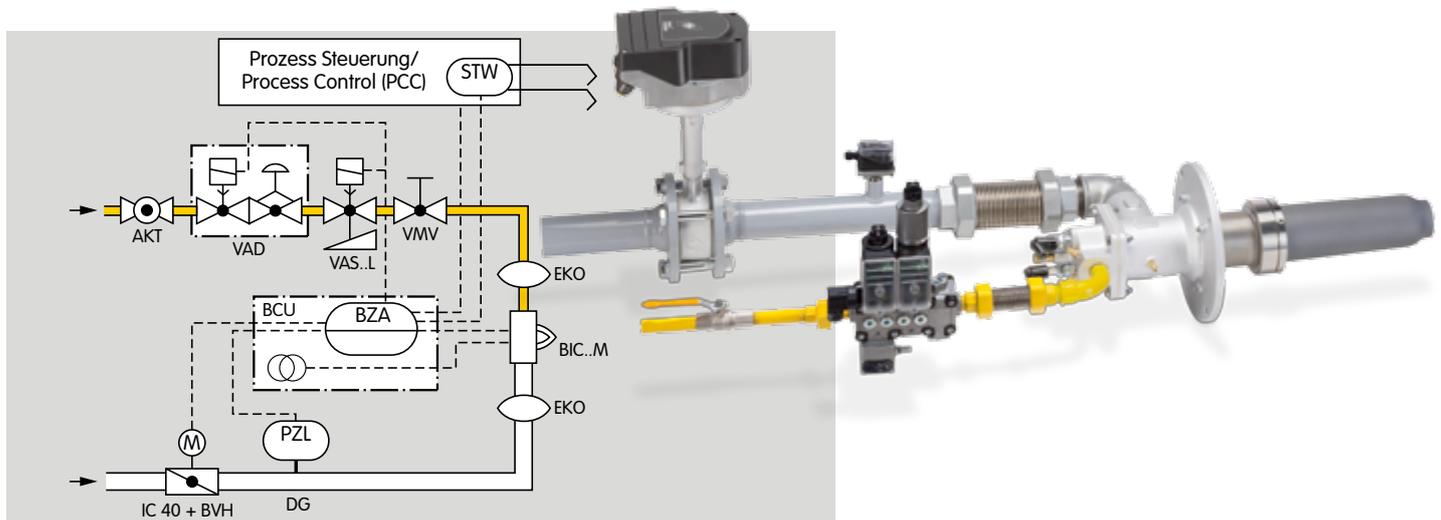
- a) traditional flame mode at low furnace temperatures and
- b) menox® low NOx mode with flameless combustion at higher furnace temperatures.

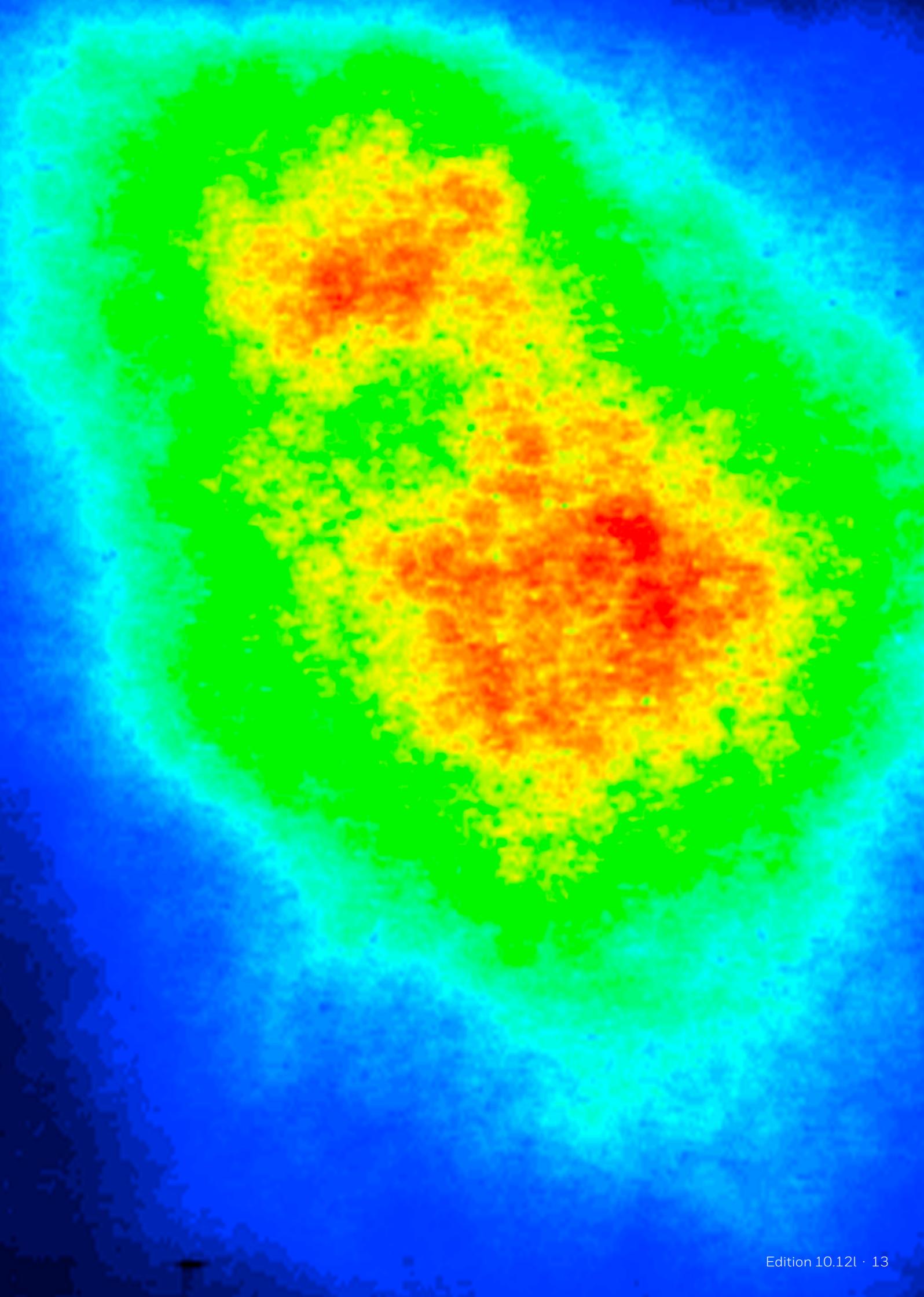
In order to heat up the furnace, the burner operates in traditional flame mode as long as the furnace temperature is low. The ignitable gas/air mixture is ignited using an electrical ignition spark and combusts inside and outside of the ceramic combustion chamber. An ionization electrode monitors the presence of the flame.

At a combustion chamber temperature of approx. 850 °C, the burner is switched to the menox® low NOx mode.

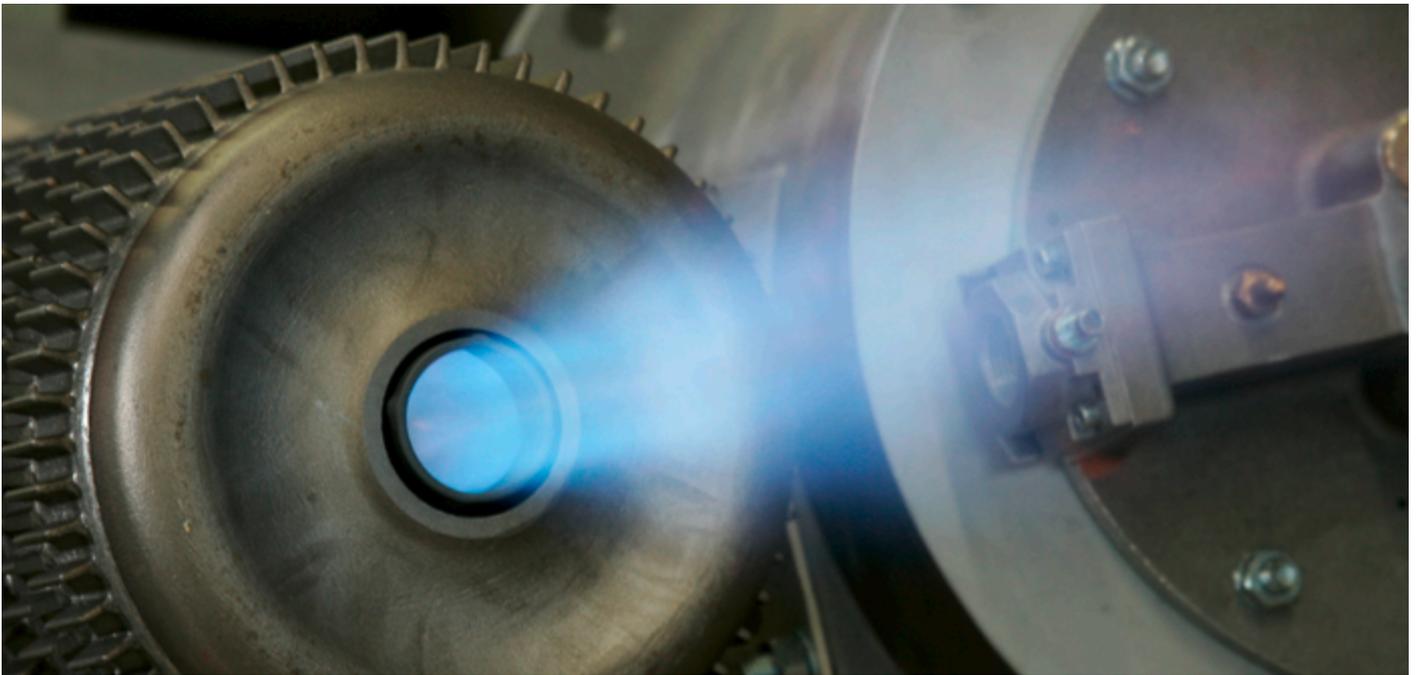
The burner is switched off and restarted in the new operating mode. In menox® mode, the gas valve and air control valve are opened without triggering the electrical ignition spark. Although gas and air are supplied via the same connections as in flame mode, the mixture is no longer ignited in the combustion chamber, but the chemical combustion reaction takes place in the furnace. In menox® mode, the oxidation reactions take place without a visible flame.

The new patented solution achieves NOx values below 150 mg/m<sup>3</sup> (reference value of 5 % O<sub>2</sub>) at a furnace temperature of 1200 °C without expensive additional piping.









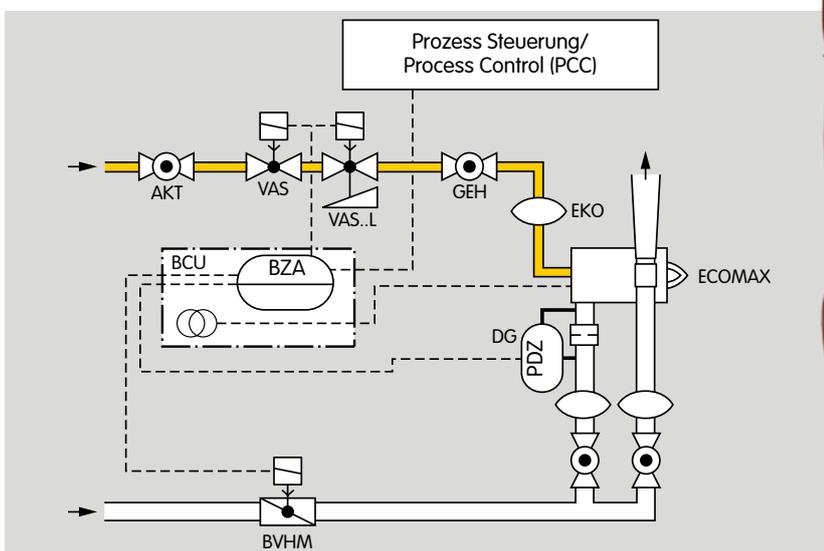
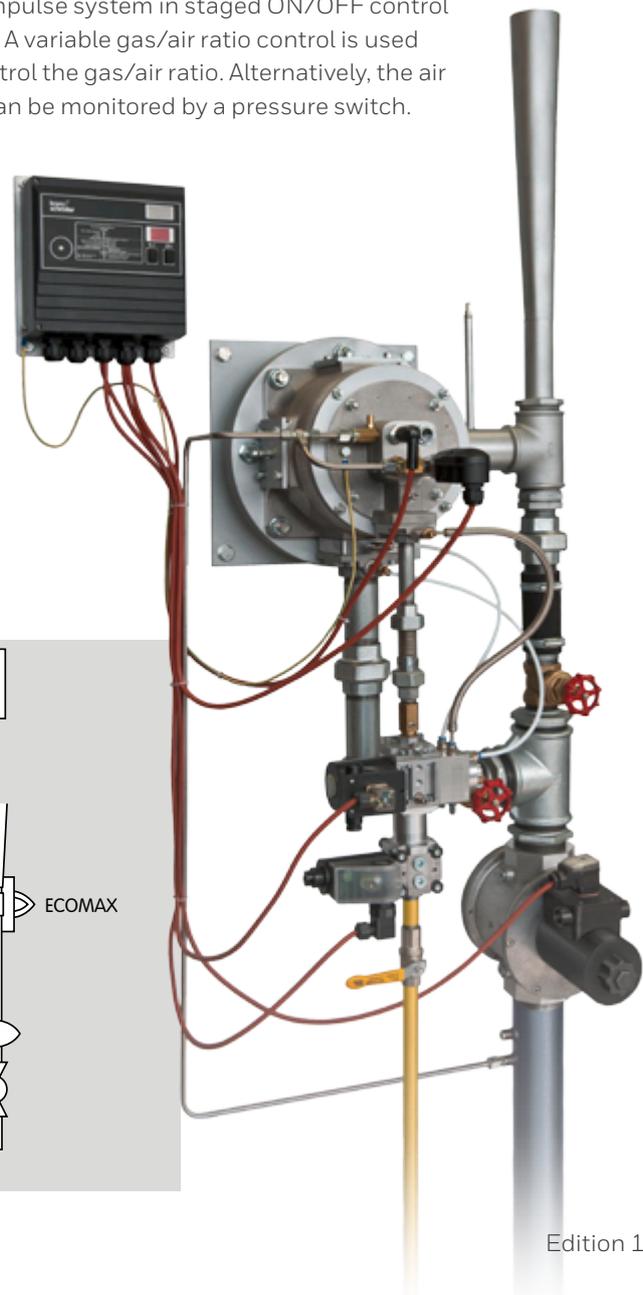
Self recuperative burner  
Ecomax®

## Stage-controlled heating system with self recuperative burner

Self recuperative burners feature an integrated heat exchanger (recuperator) to preheat the combustion air. Flue gas and combustion air are fed through a heat exchanger in the opposite direction. Depending on the burner model and mode of operation, 30 % energy savings can be achieved with air preheating up to 700 °C in comparison to cold air burners.

Self recuperative burners are used for direct heating in conjunction with an eductor for extracting the flue gases from the furnace chamber. The eductor generates a vacuum with a centrally positioned nozzle and thus draws approx. 90 % of the flue gases out of the furnace chamber along the outside of the burner's heat exchanger. The remaining quantity of flue gas air is discharged from the furnace via an additional flue gas opening and in this process is also used for furnace pressure control.

Self recuperative burners are controlled by a rotary impulse system in staged ON/OFF control mode. A variable gas/air ratio control is used to control the gas/air ratio. Alternatively, the air flow can be monitored by a pressure switch.



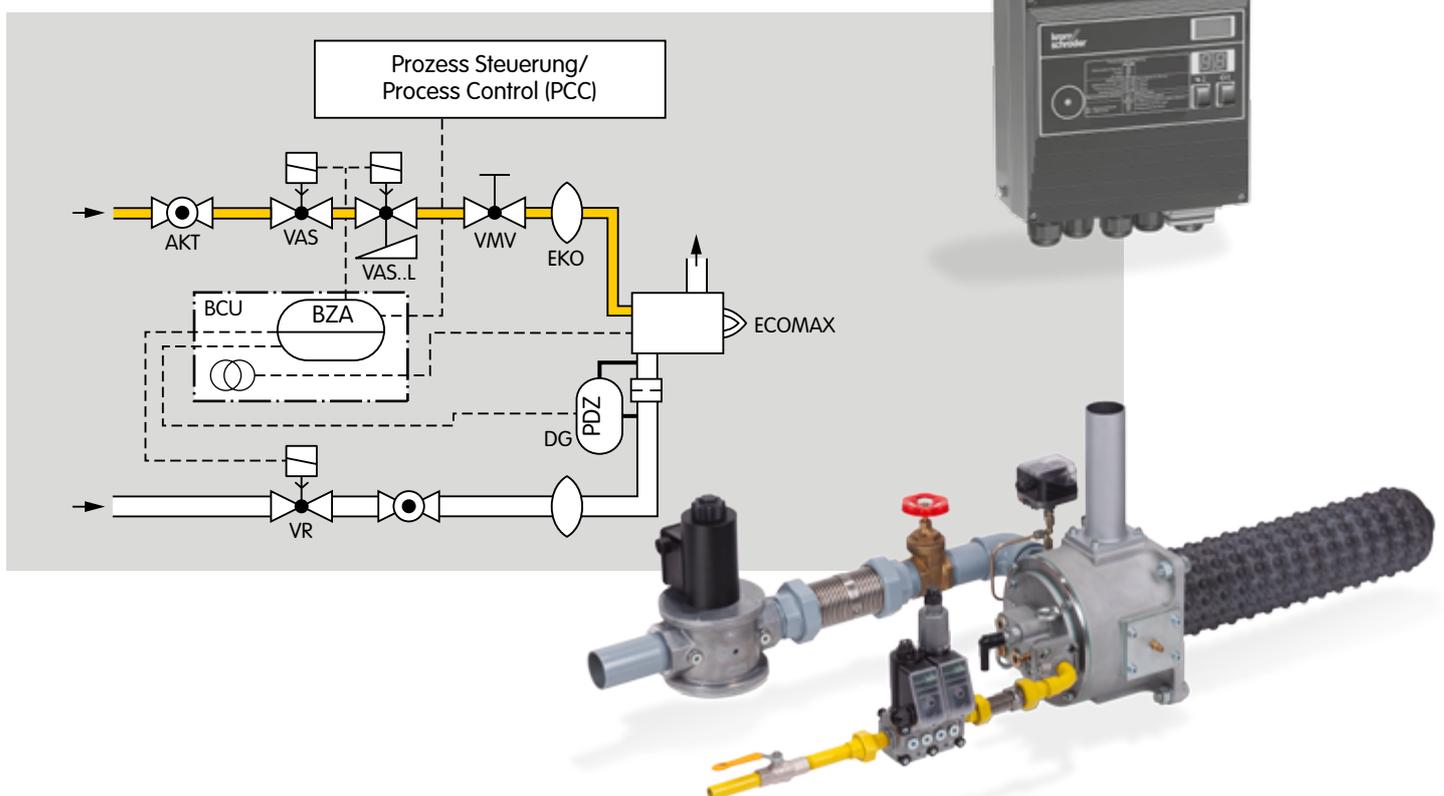


*Roller hearth furnace,  
Andernach und Bleck works photograph*

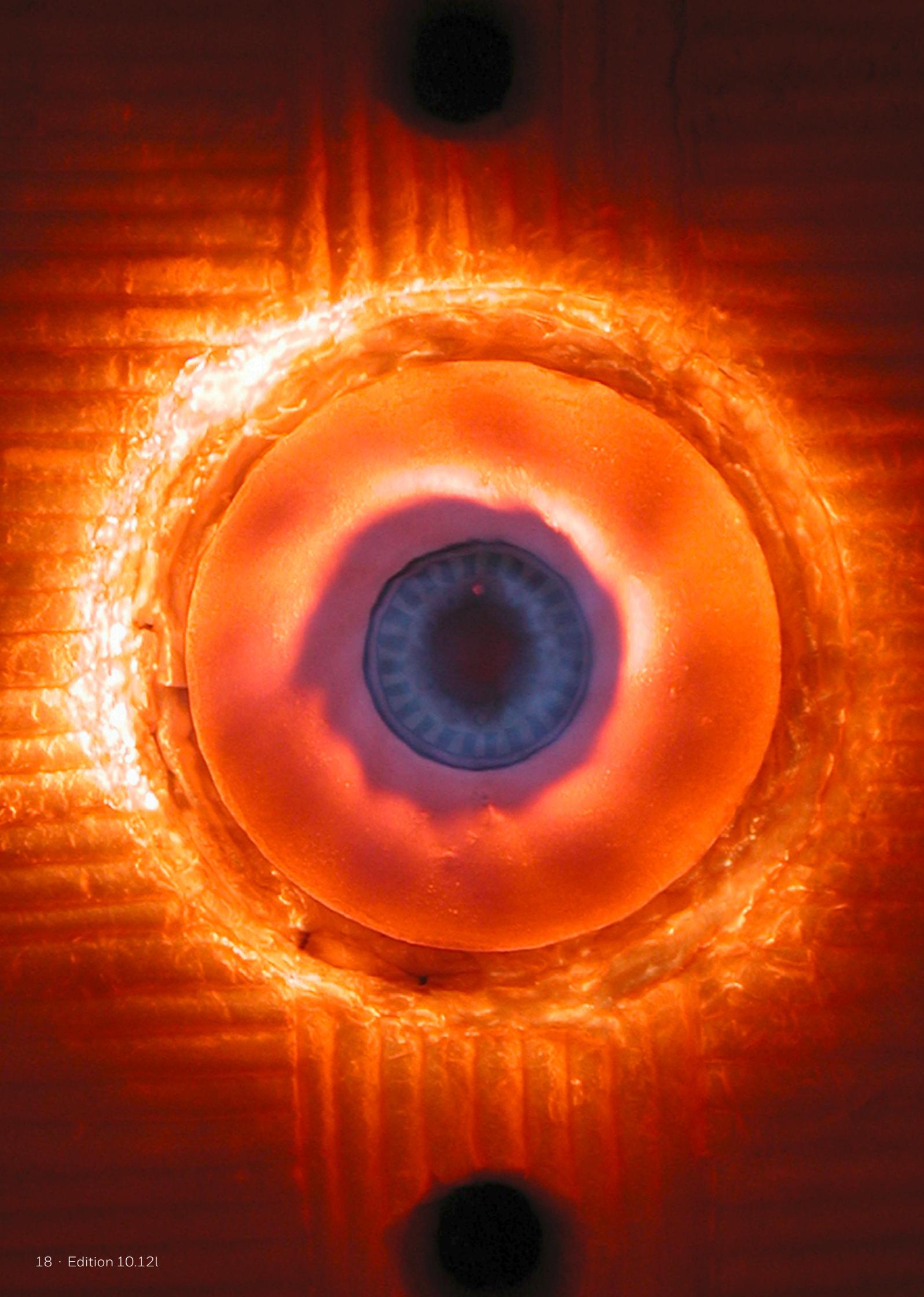
## Indirect heating with self recuperative burner and single-ended radiant tube

In processes in which the material must not come into contact with the combustion gases or in inert gas furnaces, the heating is performed indirectly with radiant tubes. For optimal energy use, self recuperative burners firing into a single-ended radiant tube or P radiant tube are often installed in this case. The system is controlled by a rotary impulse system with ON/OFF operation of the burners. The burner impulse ensures recirculation of the flue gases in order to maintain a uniform radiant tube temperature and to reduce NOx emissions.

The burner control unit BCU allows pre-ventilation and/or post-ventilation and the burners can be connected to the plant control system via PROFIBUS DP. Where differential pressure switches are used for flow monitoring, a pneumatic gas/air ratio control system is not required if defined supply pressures are guaranteed and monitored.









*Forging furnace,  
ANDRITZ Maerz works photograph*

## Ceramic flat flame burners for high-temperature processes and air preheating to high temperatures

Modern forging furnaces are equipped with flat flame burners to avoid the material coming into contact with the flame and thus prevent local overheating of the material. Due to the special geometry of the burner quarl for flat flame burners, the burner head is exposed to radiation from the furnace chamber. To protect against faults, a metallic burner head must therefore always be cooled with air when the burner is switched off, which leads to an increase in the concentration of oxygen in the furnace atmosphere.

The new series of ceramic flat flame burners CT.. has been specially developed for high-temperature processes and is made entirely from high temperature resistant materials. Instead of using a conventional burner head with metallic swirl plate, a ceramic gas lance made of SiSiC is used.

The angle of twist of the combustion air results from a special geometry with an off-centre air supply to the burner. The metallic burner housing is protected by internal insulation made of ceramic vacuum shaped parts.

The ceramic flat flame burner can be supplied in two versions:

- a) CTO for recuperative air preheating up to 550 °C and
- b) CTE for regenerative air preheating up to 1000 °C.

Burner CTO can be used like conventional flat flame burners BIO/ZIO. The CTE requires a special control algorithm which covers operation of the impulse system as well as cyclical switching between firing and flue gas extraction.



*Flat flame burner CTO*



*Flat flame burner CTE  
with fitted regenerator*

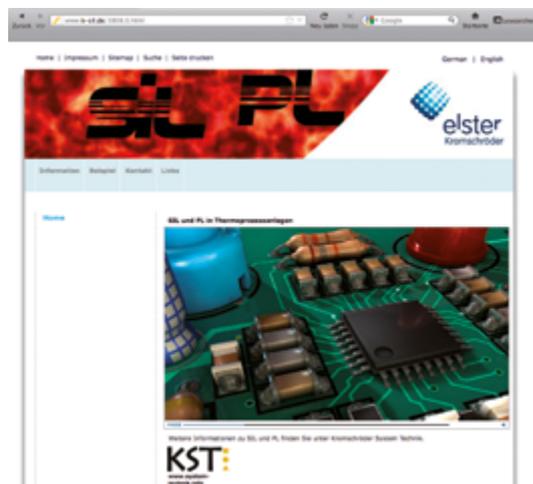
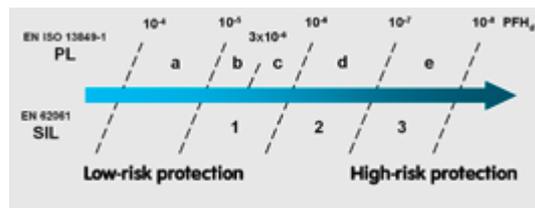


*Foundry,  
Zollern works photograph*

## Extremely safe: SIL and PL at Honeywell Kromschroder

When planning industrial furnaces, changes in the end customer's requirements often increase the planning time required – not with us. With burner technology from Honeywell Kromschroder, you can save time and money right from the planning stage.

Thermoprocessing equipment must comply with high levels of safety and reliability so that the lowest possible risk levels are generated for people, the environment, products and processes in the event of a malfunction. Probability-based approaches to risk assessment and prevention are now becoming increasingly popular in this area of application – such as Safety Integrity Level (SIL) and Performance Level (PL) classification. Comprehensive risk analyses, which are the best possible way of identifying any potential risks, are at the heart of these considerations. The precisely harmonized measures of the individual safety functions for minimizing risks are then based on these.



*Honeywell Kromschroder can provide interested companies with targeted and competent support when redesigning safety functions pursuant to SIL and PL Standards. Your contacts are the specialists in the individual branch offices who develop individual and system-specific solutions together with the respective customers. Further information on SIL and PL is also available at [www.k-sil.de/English](http://www.k-sil.de/English).*





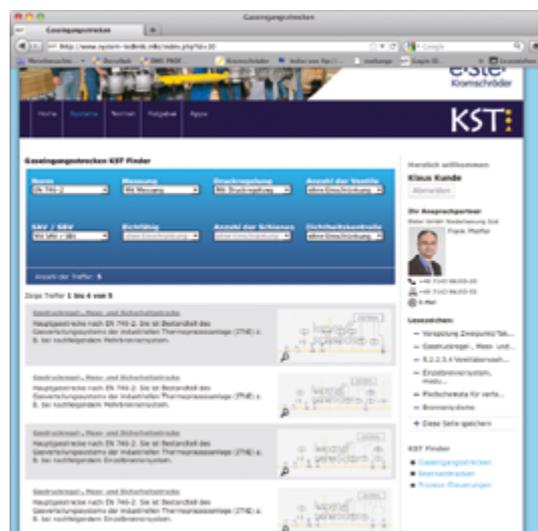


Annealing furnace, IOB works photograph

## Honeywell Kromschöder presents the Internet-based KST knowledge platform

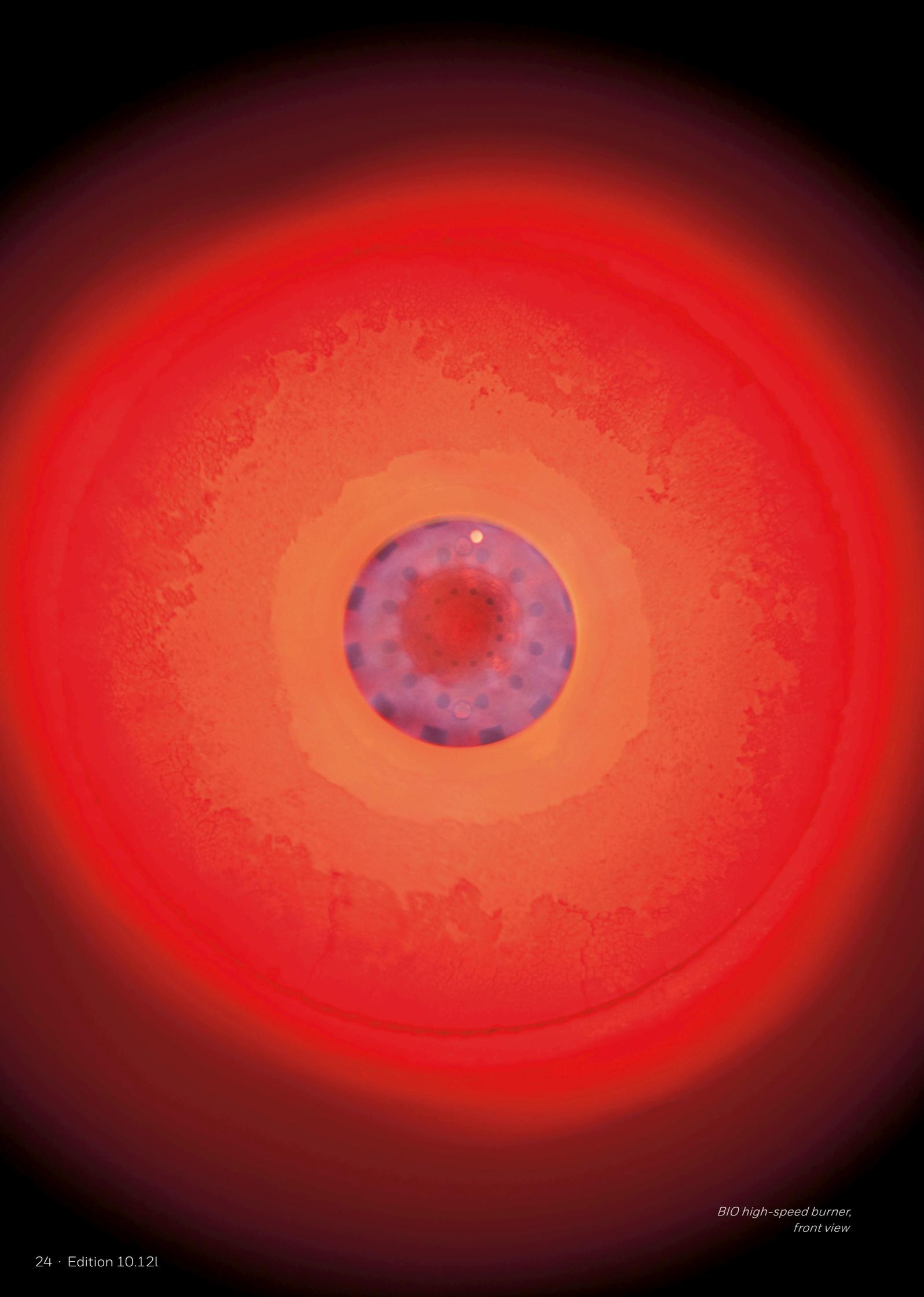
Comprehensive system knowledge is particularly valuable for planners and operators of thermoprocessing equipment. Their requirements stretch from knowledge of the physical interrelations, through compliance with legal documents such as national and international Directives and Standards, to experience of different devices and fittings and the way they interact within a system. The new "Kromschöder System Technology" (KST) knowledge platform continues to offer support and planning assistance to all planners and equipment operators, whether they are experts or newcomers, – however, now it is also available as an up-to-date system on the Internet. The user can therefore make sure that the company reacts quickly to changes and innovations and the KST platform is accordingly regularly supplemented and updated.

A key feature of the new KST is its extensive collection of example systems, with gas inlet sections, burner systems and process control systems. Each example is explained in detail using a flowchart with descriptions of the applications and functions. Notes on the system and the naming of possible components are rounded off with a link to the respective reference standards. Extracts from standards are presented descriptively and are understandably prepared with interpretations by specialists and with links to practical examples.



# KST

With the modern, future-oriented KST platform, Honeywell Kromschöder is presenting, on the Internet, system knowledge that has been proven over 20 years and which has been available in book form since the start of the 1990s and on CD-ROM since 2003. Further information about KST can be found at [www.system-technik.info](http://www.system-technik.info).



*BIO high-speed burner,  
front view*

## We have what you need!

Since our range of products and services leaves nothing to be desired!



### BIO/ZIO and BIC/ZIC

The capacity range of these burner series with direct ignition and monitoring along with low pollution and optimized combustion ranges from 1.5 to 1000 kW. Thanks to their modular design, customized variants for various applications and types of gas can be supplied. The burners BIO and ZIO are equipped with a heat-resistant flame tube to be combined with a burner quarl. For applications in the lower and medium temperature range, the burners can also be operated with a metallic attachment tube instead of the burner quarl. BIC and ZIC are prepared for attachment of a ceramic tube set TSC.



### BLOW/ZIOW and BICW/ZICW

The time-tested burners BIO/ZIO and BIC/ZIC are also available in a version with internal insulation for combustion air preheated to higher temperatures up to 500 °C. The welded burner housing features an air connection flange. The burner may be adapted to the system requirements using different burner lengths.



### BBG

The burners in this burner series cover a capacity range of 700 to 6400 kW and can be supplied with a ceramic air nozzle head. Depending on the furnace temperature, they are used in conjunction with a stainless steel combustion chamber (BAT) or a refractory concrete combustion chamber (BRT). A version with internal insulation is available for hot air > 315 °C.



### TriOx

Burners TriOx have been optimized for use in continuous furnace systems. They can be switched to INVISIFLAME® mode for ultra low NO<sub>x</sub> at a furnace temperature of > 870 °C. Furthermore, variants which only operate in INVISIFLAME® mode are available for high-temperature applications. The burners, which are predominantly used in brick-lined furnaces, are equipped with a refractory concrete combustion chamber. No additional burner quarl is necessary.

### Excess air burner BIC..L

This burner can be ignited at all capacity settings over the entire control range. The extremely high air excess reaching up to approx. 1500 % ensures a very high pulse magnitude even at a low burner rating. The BIC..L can thus be used to optimize applications requiring precise temperature control and consistent product quality. The modular design means that it can be easily adapted to any kiln geometry.



### Self recuperative burners ECOMAX®

Burners ECOMAX® with integrated recuperator enable energy savings of up to 30 % due to air preheating up to 700 °C. They are used for direct heating or in conjunction with single-ended radiant tubes for indirect heating of furnace systems.



### Forced draught burners PBG

Completely pre-assembled and pre-wired burner unit with mounted fan, gas safety and control system and burner control unit for applications in industry. Typical applications include drying systems, hot-air generators, flue air purification or process gas heating.



### Ceramic tube sets TSC

The TSC ceramic tube sets cover the entire range of user-specific requirements thanks to different versions depending on flame shape, capacity, flue gas outlet velocity or application temperature.



### ZMIC

Ionization pilot burners ZMI have been extended to include ZMIC with ceramic flame tube. The ceramic flame tube is made of SiC material and has a considerably longer service life than the metallic variant ZMI when subject to high temperatures. Due to the tapered combustion chamber, a longer, sharper flame is formed by the ZMIC than by the ZMI.



## And this can also help you to optimize your processes



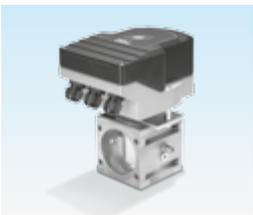
### Controls series valVario

The controls series valVario can be used for safety, control and regulation purposes in air and gas supply systems to gas appliances. It can also be used for main gas control and safety. valVario is approved for a maximum inlet pressure of 500 mbar and allows higher flow rates with the same nominal size. Simple installation is just one of many advantages of its compact design. On the standard version, the flow adjustment can be checked using an indicator, while a blue LED is used to check the overall function.



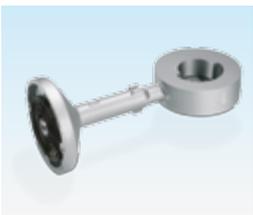
### Actuators IC 20, IC 40

Honeywell Kromschröder actuators of the IC 20 and IC 40 series for direct mounting on butterfly valves BVG(F), BVA(F) and BVH(S) for gas, cold air and hot air up to 450 °C have proved their worth throughout the world. Actuator IC 20 is controlled continuously or by a three-point step signal. Due to its outstanding flexibility, the IC 40 is suitable for various control types ranging from continuous control to staged control.



### Lambda controls with linear flow control LFC

Constantly growing demands on the control quality of furnace atmospheres require high-quality and nevertheless cost-effective adjustment devices. Honeywell Kromschröder new generation linear flow controls meet these requirements. They are ideal for use in large lambda and capacity ranges with continuous control for uninterrupted duty.



### BVH(M)

The butterfly valves are designed to adjust volumes of gas, cold and hot air and flue gas on gas and air appliances and flue gas lines. They are designed for control ratios up to 1:10, and with the mounted actuator IC 20 or IC 40 they are suitable for regulating flow rates for modulating or stage-controlled combustion processes. Well suited to intermittent operation due to the large number of operating cycles in conjunction with the solenoid actuator MB 7.

### Protective system control FCU 500

This is designed to monitor and control central safety functions, e.g. Gas<sub>min</sub>, Gas<sub>max</sub>, Air<sub>min</sub>, pre-purge, tightness test and high temperature operation in multiple burner systems on industrial furnaces. The FCU can be used centrally to control several zones or in the individual zones as protective system and capacity control. If the centrally checked safety requirements, e.g. pre-purge, flow detector and pressure switch scan, have been met, the FCU 500 issues the start enable signal to the burner control units.



### PFU

The burner control units PFU 760 control, ignite and monitor gas burners for intermittent or continuous operation. As a result of their fully electronic design they react quickly to various process requirements and are therefore also suitable for frequent cycling operation.



### MPT

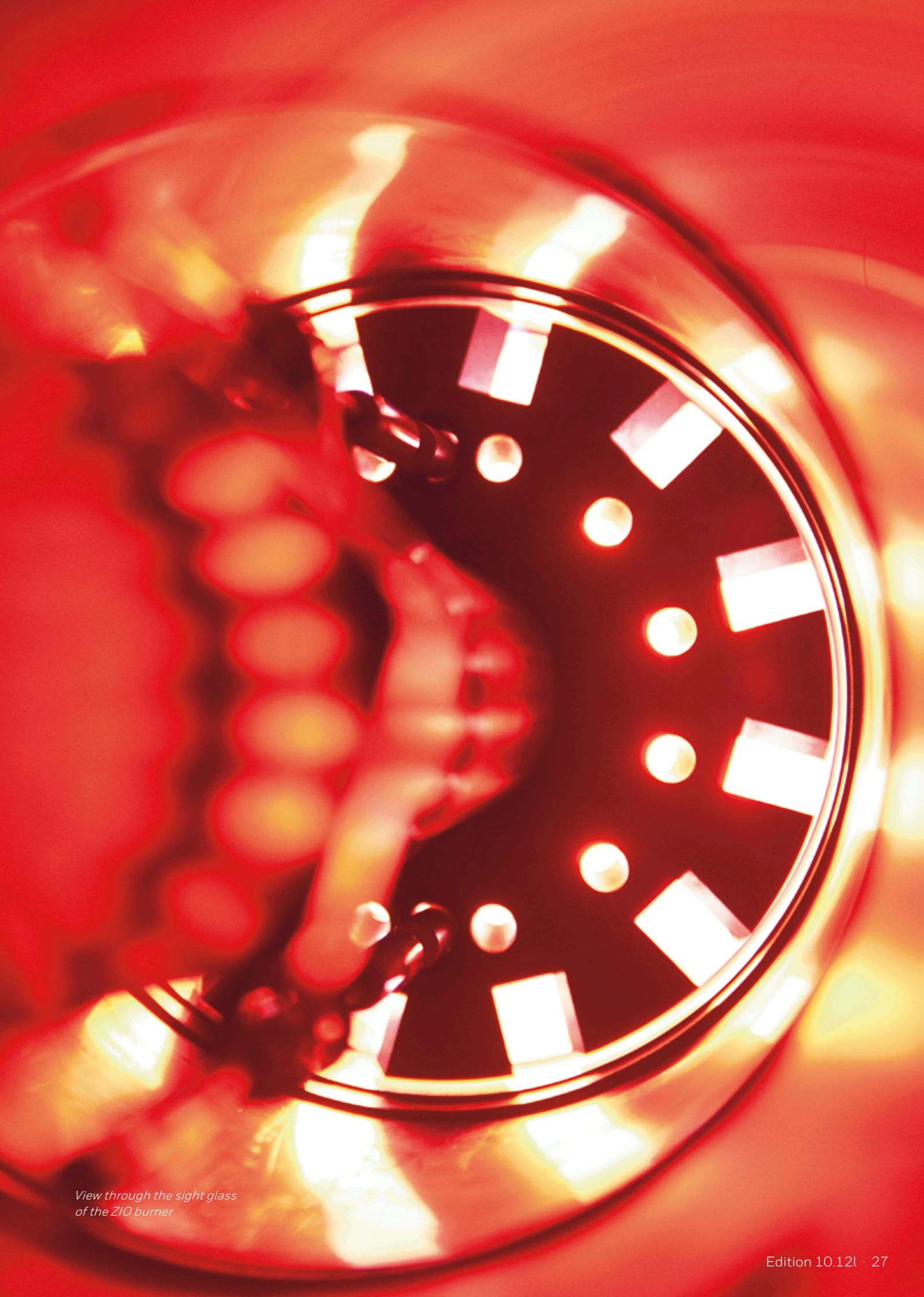
19" module for converting a controller signal to timing cycles for gas burners. The furnace atmosphere is circulated thanks to this intermittent operation, and thereby uniform temperature distribution and shorter heating-up periods for all gas-fired heat treatment furnaces are ensured. Eight different operating modes can be parameterized on the MPT 700.



### Burner control unit BCU®

The BCU® series replaces the local control cabinet. It unites the functionally interrelated components of automatic burner control unit, ignition transformer, operation-control module for Manual/Automatic mode and operating and fault diagnostic system in a compact metal housing. It is suitable for intermittent and continuous operation. Parameterization and extended diagnostics are performed using the PC software BCSOFT. BCU 460 for directly ignited burners, BCU 465 for radiant tube applications, BCU 480 for pilot/main burner systems, BCU..L with air valve control, optionally with Profibus DP.





*View through the sight glass  
of the ZIO burner*

## Contact

[www.kromschroeder.com](http://www.kromschroeder.com) → Process Heat → Sales

Elster GmbH

Strotheweg 1 · 49504 Lotte (Büren)

Germany

Tel. +49 541 1214-0

[hts.lotte@honeywell.com](mailto:hts.lotte@honeywell.com)

[www.ThermalSolutions.honeywell.com](http://www.ThermalSolutions.honeywell.com)

We reserve the right to make  
technical modifications in the  
interests of progress.  
Copyright © 2017 Elster GmbH  
All rights reserved.

**Honeywell**  
THE POWER OF **CONNECTED**