

**Honeywell**

THE POWER OF **CONNECTED**



## | **Industrial burners for gas**

**ECLIPSE**

**krom  
schroder**

Product brochure · GB 7 Edition 06.15l

## Direct fired furnace burners

### Burner for gas BIO, ZIO

For industrial furnaces and firing systems in the iron and steel industries in the precious, non-ferrous and light metal sector as well as in the plastics, fibre and paper industries. Other fields of application are thermal incineration installations, as well as driers and hot-air generators.

The burners are used in combination with a burner quarl made from refractory concrete (e.g. in a forging furnace). Different flame shapes can be achieved by using burner quarls with different geometries.

The burner may be adapted to the system requirements using different burner lengths.



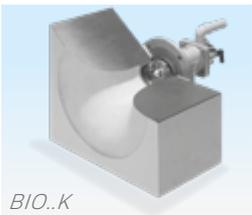
BIO



ZIO



BIO.W



BIO..K

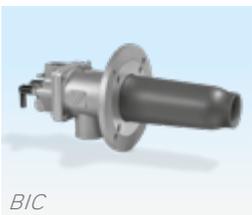
BIO with cast steel housing ZIO with steel housing	
Type	Nozzle-mixing
Number of sizes	8 (size 50 – 200)
Capacity range	40 – 1000 kW (151 – 3780 kBTU/h)*
Turndown	10:1
Max. process temperature	1600°C (2912°F)
Max. combustion air temperature	450°C (840°F) 500°C (930°F) with internal insulation
Fuels	Natural gas, propane, butane, coke oven gas, LCV gas, biogas
<b>Key attributes</b> Safe flame control thanks to ionization electrode and reliable electrical ignition. Length increments enable individual adjustment either to new systems or when modernizing existing systems. Housing with internal insulation to reduce the surface temperature available.	

### Burners with ceramic tube BIC, ZIC

For industrial furnaces and firing systems in the iron and steel industries in the precious, non-ferrous and light metal sector as well as in the plastics, fibre and paper industries. Burners BIC, BICA or ZIC can also be used in thermal incineration installations, as well as in driers and hot-air generators.

The burner can be used in conjunction with the ceramic tube set TSC in furnaces with brick lining or ceramic fibre lining. No burner quarl is required to serve as combustion chamber.

Thanks to their medium to high outlet velocity (80 to 150 m/s), burners BIC, BICA are ideal for industrial furnaces whose temperature is controlled by an impulse system.



BIC



ZIC



BICA

BIC with cast steel housing ZIC with steel housing	
Type	Nozzle-mixing
Number of sizes	8 (size 50 – 200) With TSC ceramic tubes 22 different combinations possible
Capacity range	15 – 1000 kW (57 – 3780 kBTU/h)*
Turndown	10:1
Max. process temperature	1450°C (2640°F)
Max. combustion air temperature	450°C (840°F) 500°C (930°F) with internal insulation
Fuels	Natural gas, propane, butane, coke oven gas, LCV gas, biogas
<b>Key attributes</b> Can be combined with different ceramic combustion chamber shapes. Ensure high temperature uniformity in the furnace thanks to high pulse frequency and reliable electrical ignition. Length increments enable individual adjustment either to new systems or when modernizing existing systems.	



## menox® burner BIC..M

Special BIC variants which can be switched to Menox mode for ultra low NO<sub>x</sub> at furnace temperatures > 850°C/1560°F in conjunction with a special burner control unit.

BIC..M	
Type	Nozzle-mixing
Number of sizes	5 (size 65 – 140)
Capacity range	35 – 360 kW (132 – 1360 kBTU/h)*
Max. process temperature	1250°C (2280°F)
Fuels	Natural gas, LPG (gaseous), coke oven gas, other gases on request
<b>Key attributes</b> Ultra low NO <sub>x</sub> thanks to flameless combustion. Single gas connection, no additional piping required. Easy upgrade of existing BIC installations possible.	



BIC..L

## Excess air burner BIC..L

Excess air burner for all applications requiring precise temperature control and consistent product quality. The burner is perfectly designed for use in tunnel kilns and intermittent systems. Thanks to the high excess air capability, variable flue gas temperatures of up to approx. 100°C can be reached. With reliable ignition over the entire burner output range, this accommodates the furnace operator's wish for a simple structured gas/air control.

The burner can be used in conjunction with the ceramic tube set TSC in furnaces with brick lining or ceramic fibre lining. High outlet velocities of up to 170 m/s are possible.

BIC..L	
Type	Nozzle-mixing
Number of sizes	4 (size 80 – 140)
Capacity range	75 – 440 kW (283 – 1660 kBTU/h)*
Turndown	15:1
Max. process temperature	1450°C (2640°F)
Fuels	Natural gas, LPG (gaseous), other gases on request
<b>Key attributes</b> High exit velocity. High excess air capability and wide control range. Easy setup thanks to integrated air and fuel metering orifices. Available in a variety of lengths.	



BIC..L extended

## Annular excess air burner BIC..R

The annular excess air burner, comprising burner BIC or BICA, annular excess air burner housing RSG and two ceramic tubes TSC, is suitable for use in industrial kilns in the ceramics, pottery and enamel industries, particularly in high-speed kilns. Separate secondary air ensures CO-optimized combustion with high excess air. The large air cross-sections enable large volumes of air to be introduced during the system's cooling phase, which leads to a reduction in the cooling time and therefore to an increase in the system's availability. Reducing and oxidizing combustion are possible.



BIC..R

BIC..R	
Type	Nozzle-mixing
Number of sizes	3 (size 65 – 140) With TSC ceramic tubes, 10 different combinations possible
Capacity range	15 – 360 kW (57 – 1360 kBTU/h)*
Turndown	10:1
Max. process temperature	1450°C (2640°F)
Max. combustion air temperature	450°C (840°F)
Fuels	Natural gas, LPG (gaseous), coke oven gas, other gases on request
<b>Key attributes</b> Separate connection for secondary air. Low pollutant emissions even with high excess air. Modulating control and impulse control possible. Reliable electrical ignition and safe flame control thanks to ionization control.	

\* Capacities in kW refer to the lower calorific value H<sub>v</sub> and capacities in BTU/h refer to the upper calorific value H<sub>o</sub>



ThermJet



ThermJet with quarl



ThermJet ceramic

## High-velocity burner ThermJet

For industrial furnaces and firing systems in the metals industries (ferrous and non-ferrous) as well as the ceramics industry. Other fields of application include thermal oxidizers (incineration) and a variety of drying processes. ThermJet is a direct fired, nozzle-mixing burner that is designed to fire an intense stream of hot gases through a high velocity nozzle. The extremely high velocity of the gases improves temperature uniformity, product quality and system efficiency. ThermJet is available in either high velocity or medium velocity versions in 14 sizes. ThermJet can be adapted to operate with either ambient or preheated combustion air.

ThermJet	
Type	Nozzle-mixing
Number of sizes	14 (size 15 – 2000)
Capacity range	40 – 5280 kW (0.15 – 20 MBTU/h)*
Turndown	10:1 on ratio 50:1 with fixed air
Max. process temperature	1540°C (2800°F)
Max. combustion air temperature	540°C (1000°F)
Fuels	Natural gas, propane, butane, coke oven gas, other gases on request
<b>Key attributes</b> Versions available for preheated air. Easy set-up with built-in metering. Robust, reliable performance. High turndown plus high excess air capability. Alloy, ceramic and refractory combustor options. Flame speeds up to 207 m/s (680 ft/s). Flexible control: high/low, on-ratio, or fixed-air.	



BBG

## Gas beta burner BBG

All-purpose, high input industrial burner for use in open heating systems.

Depending on the required furnace temperature, the burners are used in conjunction with a stainless steel combustion chamber (BAT) or a refractory concrete combustion chamber (BRT)

BBG	
Type	Nozzle-mixing
Number of sizes	5 (size 4 – 12")
Capacity range	715 – 6400 kW (2.7 – 24.2 MBTU/h)*
Turndown	10:1
Max. process temperature	1540°C (2800°F)
Fuels	Natural gas, LPG (gaseous), coke oven gas, other gases on request
<b>Key attributes</b> High-quality, rugged steel design with low air and fuel pressure requirements. Engineered to operate across a broad range of air/fuel ratios. Insulated versions for preheated air up to 480°C (900°F). Direct spark or pilot ignition.	

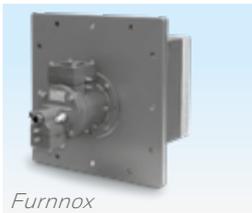


ExtensoHeat

## ExtensoHeat

The ExtensoHeat lance burner is designed for firing zones of continuous kilns for bricks, roof tiles and rough ceramic products. It is ideal for rooftop installations and furnace zones with operating temperatures above 750 °C (1382 °F). The burner lance extends through thick furnace walls and is capable of up to 60% excess gas operation.

ExtensoHeat	
Type	Nozzle-mixing
Number of sizes	1
Capacity range	132 kW (500 kBTU/h)*
Turndown	6:1
Max. process temperature	1500°C (2300°F)
Fuels	Natural gas, butane, propane and other types of fuel gas
<b>Key attributes</b> Flame viewing port. Simple and reliable. Durable construction. Adjustable air and gas valves for precise control.	

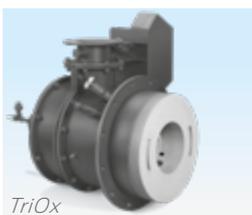


Furnnox

## Ultra low NO<sub>x</sub> burner Furnnox

For continuous high temperature applications (e.g. annealing/pickling lines) as well as non-continuous applications such as forge and heat treatment furnaces. Furnnox is a direct fired furnace burner with exceptionally low emissions for continuous high-temperature processes, e. g. in steel industry. Furnnox is capable of producing NO<sub>x</sub> emissions of less than 30 ppm at 3% O<sub>2</sub> in most high-temperature applications. To achieve high efficiency, the burner is controlled on-ratio throughout the operating range. Available in standard configuration for ambient air or insulated versions for preheated combustion air.

Furnnox	
Type	Nozzle-mixing
Number of sizes	5 (size 25 – 200)
Capacity range	66 – 530 kW (0.25 – 2 MBTU/h)*
Turndown	10:1
Max. process temperature	1540°C (2800°F)
Max. combustion air temperature	600°C (1100°F)
Fuels	Natural gas, propane, butane
Key attributes Very low NO <sub>x</sub> . Robust, reliable performance. Compact, modular design.	



TriOx

## Triple air staged ultra low NO<sub>x</sub> burners TriOx

The 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 are equipped with a refractory concrete combustion chamber. No additional burner quartz is necessary. The burners are predominantly used in brick-lined furnaces.

TriOx	
Type	Nozzle-mixing
Number of sizes	5 (size 6 – 16")
Capacity range	700 – 7310 kW (2.6 – 27.6 MBTU/h)*
Turndown	10:1
Max. process temperature	1480 °C (2700 °F)
Max. air temperature	TriOx 1: ambient temperature TriOx 2: 480°C (900°F)
Fuels	Natural gas, LPG (gaseous), coke oven gas, other gases on request
Key attributes Low air and fuel pressure requirements. Optimized to produce low emissions levels. Insulated versions for preheated air up to 480°C (900°F).	

\* Capacities in kW refer to the lower calorific value H<sub>v</sub> and capacities in BTU/h refer to the upper calorific value H<sub>o</sub>

## Self recuperative and radiant tube burners



ECOMAX..C

### Self recuperative burners ECOMAX®

The burners with integrated recuperator ECOMAX® are used for heating on either direct or indirect furnace systems.

ECOMAX® self recuperative burners are used in conjunction with metal or ceramic radiant tubes as indirect heating equipment whenever the combustion gases are to be separated from the product.

In conjunction with the flue gas eductor EJEK to return the flue gas, the burner may be used in directly heated industrial furnaces and firing systems.



ECOMAX..M



ECOMAX with eductor EJEK

### Segmented flame tube SICAFLEX®

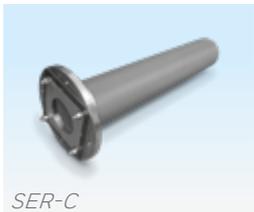
SICAFLEX® segmented flame tubes are used to guide hot flue gases in single-ended radiant tubes in conjunction with a self recuperative burner.



Sicaflex®

### ThermJet self recuperative burner TJSR

TJSR is a direct fired, self recuperative burner that combines a high velocity flame with fuel saving recuperation. A space-saving integral eductor pulls the furnace exhaust through an internal SiC recuperator. This can improve furnace efficiency by reducing fuel consumption by as much as 50% compared to typical ambient air burners. TJSR eliminates the need for hot air duct work and secondary eductor air.



SER-C



TJSR



SER

### Single ended radiant tube burner SER

SER (Single Ended Radiant Tube Burner) is a Nozzle-mixing burner with a recuperator that is coaxially mounted inside a single ended radiant tube. Combustion air entering the SER burner is preheated in the recuperative section by exhaust gases to provide up to 80% efficiency. SER burners have the added feature of internal flue gas recirculation, resulting in lower NO<sub>x</sub> emissions. The SER delivers exceptional heat flux and temperature uniformity. SER burners can be used with either metallic or ceramic radiant tubes in conjunction with segmented ceramic inner tubes.

### Radiant tube SER-C

The ceramic radiant tube SER-C is used in conjunction with a self recuperative burner for indirect heating in heat treatment processes where the combustion gases must be separated from the product.

ECOMAX	
Type	Nozzle-mixing
Number of sizes	7 (size 0 – 6)
Capacity range	25 – 500 kW (95 – 1890 kBTU/h)*
Turndown	3:1
Max. process temperature	1300°C (2370°F)
Fuels	Natural gas, LPG LCV gas, coke oven gas

#### Key attributes

For direct and indirect heating equipment.

Economical, energy-saving operation thanks to internal air preheating.

Highly efficient with a ceramic burl tube recuperator, a cast steel ribbed tube recuperator.

TJSR	
Type	Nozzle-mixing
Number of sizes	4 (size 20 – 100)
Capacity range	53 – 270 kW (200 – 1000 kBTU/h)*
Turndown	10:1
Max. process temperature	1200°C (2200°F)
Fuels	Natural gas

#### Key attributes

All the features of the ThermJet with dramatically improved efficiencies.

Single air connection for combustion air and flue gas ejector simplifies piping.

90 – 100 % of flue gas exhausted through burner.

SER	
Type	Nozzle-mixing
Number of sizes	3 (4.5", 6", 8" tubes)
Capacity range	37 – 80 kW (140 – 300 kBTU/h)*
Turndown	10:1
Max. process temperature	1010°C (1850°F)
Fuels	Natural gas

#### Key attributes

Up to 80% efficiency.

Compact design incorporates burner and recuperator.

Easy installation and set-up.



TFB

## Tube Firing Burner TFB

The Tube Firing Burner (TFB) is designed to fire into radiant and immersion tubes. The unique nozzle design creates a uniform, adjustable flame length. The long, spiraling flame results in cleaner combustion, efficient heat transfer and uniform tube temperatures. The flame scrubs the inside of the fire tubes to remove the gas film boundary layer and increase heat-transfer effectiveness with outstanding temperature uniformity.

Tube Firing Burner	
Type	Nozzle-mixing
Number of sizes	3 (size 30 – 200)
Capacity range	80 – 530 kW (300 – 2000 kBTU/h)*
Turndown	30:1
Max. process temperature	1040°C (1900°F)
Fuels	Natural gas, propane, butane
Key attributes	
Easy set-up with built-in orifice plates.	
One burner for multiple sized radiant tubes.	
Outstanding heat distribution.	



BU

## Bayonet-Ultra Recuperators BU

The Bayonet-Ultra Recuperator is a high efficiency heat exchanger designed to fit into the exhaust leg of single, U, W or Trident-type radiant tubes. It is frequently paired with Eclipse Tube Firing Burners and is suitable for use with exhaust streams up to 1090°C (2100°F). This can provide fuel savings of up to 30%. The Bayonet-Ultra contains multiple tubes that dramatically increase the heat transfer area, while significantly decreasing the amount of fuel necessary to maintain required heat levels.

Bayonet-Ultra Recuperators	
Type	Recuperator
Number of sizes	5 (3 – 8" tubes)
Capacity range	16 – 110 kW (6.09 – 400 kBTU/h)*
Max. process temperature	1090°C (2100°F)
Key attributes	
Outstanding heat recovery value.	
Improves burner efficiency up to 65%.	
Air-cooled housing.	



E-Jector FGR

## Flue gas recirculation device E-Jector FGR

E-Jector is a flange-mounted device that is used with radiant tubes to reduce NO<sub>x</sub> emissions by mixing flue gases with combustion air. It accommodates radiant tube diameters of 102 – 152 mm (4 – 6 inches). E-Jector is frequently used with Eclipse Bayonet-style recuperators to deliver higher fuel efficiencies while keeping NO<sub>x</sub> under control.

E-Jector	
Type	FGR device
Number of sizes	(102 – 152 mm) 4 – 6"
Capacity range	132 kW max (500 kBTU/h)* max
Max. process temperature	760°C (1400°F) flue gas
Key attributes	
Up to 50% NO <sub>x</sub> reduction.	

\* Capacities in kW refer to the lower calorific value  $H_u$  and capacities in BTU/h refer to the upper calorific value  $H_o$

## Oxy-fuel burners and burners for the glass industry



PrimeFire® 100

### PrimeFire® 100

The PrimeFire 100 oxygen-fuel burner has become an industry standard for glass furnace applications. It provides improved refractory life and reduced melting costs. The burner produces a conical-shaped flame and has multiple-fuel capabilities, from natural gas to light/heavy oils. The adjustable control on the burner allows variation in flame coverage to suit melter size and temperature profile.

PrimeFire® 100	
Type	Oxygen-fuel/Nozzle-mixing
Number of sizes	4
Capacity range	270-5300 kW (1 – 20 MBTU/h)*
Max. process temperature	1650°C (3000°F)
Flame shape	Conical-adjustable
Fuels	Natural gas, propane, fuel oil
Key attributes Uniform heat distribution. High luminosity. No maintenance required.	



PrimeFire® 300

### PrimeFire® 300

The PrimeFire 300 burner for glass furnaces creates a fan-shaped flame with low momentum, which creates a lower peak flame temperature. This results in lower operating crown temperatures and lower volatile transport rates. The flame shape can be adjusted to suit the melter width and the required temperature profile. The PrimeFire 300 burner improves flame luminosity which increases radiant heat transmission to improve furnace efficiency.

PrimeFire® 300	
Type	Oxygen fuel/Nozzle-mixing
Number of sizes	3
Capacity range	530-2130 kW (2 – 8 MBTU/h)*
Max. process temperature	1650°C (3000°F)
Flame shape	Flat-adjustable
Fuels	Natural gas, fuel oil
Key attributes Fan-shaped flame. Increased flame radiation, adjustable flame shape. Extremely low mixing rates of oxygen and fuel streams.	

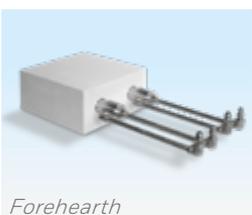


PrimeFire® 400

### PrimeFire® 400

PrimeFire 400 oxygen-fuel burner creates a fan-shaped flame geometry. The burner mixes a portion of the combustion oxygen with the fuel stream, causing gas cracking. This produces free carbon particles that increase flame luminosity which improves the radiant heat transfer to the glass load. As a result, overall furnace efficiency is improved, peak flame temperatures are reduced and NO<sub>x</sub> formation is lowered.

PrimeFire® 400	
Type	Oxygen-fuel/Nozzle-mixing
Number of sizes	4
Capacity range	530-5300 kW (2 – 20 MBTU/h)*
Max. process temperature	1650°C (3000°F)
Flame shape	Flat-adjustable
Fuels	Natural gas, propane, fuel oil
Key attributes Fan-shaped flame. Patented "gas cracking" technology for maximum luminosity and highest efficiency. Significant reduction in NO <sub>x</sub> emissions.	



Forehearth

### PrimeFire® Forehearth

PrimeFire Forehearth burners deliver significant reductions in fuel consumption and emissions in glass forehearth operations. The burners can reduce fuel consumption by over 60%, reduce NO<sub>x</sub> emissions by over 70% and deliver a high glass yield. In addition, improved glass quality is also achieved due to the lower surface tension created with air-fuel combustion. The nozzle-mix design eliminates the equipment costs associated with pre-mix style burners.

PrimeFire® Forehearth	
Type	Oxygen-fuel/Nozzle-mixing
Number of sizes	4
Capacity range	3-13 kW (12 – 50 kBTU/h)*
Max. process temperature	1300°C (2400°F)
Flame shape	Conical
Fuels	Natural gas
Key attributes 70% reduction in NO <sub>x</sub> emissions. 60% reduction in fuel consumption. Improved glass temperature homogeneity.	



BrightFire® 200

## BrightFire® 200

BrightFire® 200 is an adjustable, low NO<sub>x</sub>, air-fuel burner, compatible with regenerative glass furnaces. The burner provides superior flame adjustability by splitting the gas inside the burner into two independently variable gas flows. This allows increased flexibility in flame geometry and therefore the location of heat release into the glass melt, in addition to a significant reduction in NO<sub>x</sub>.

BrightFire® 200	
Type	Side-of-port or underport; regenerative
Capacity range	2670 – 8270 kW (10 – 31 MBTU/h)*
Max. process temperature	1650°C (3000°F)
Fuels	Natural gas, fuel oil
Key attributes Very low NO <sub>x</sub> . Highly adjustable - superior flame control. Single gas inlet for easy upgrade from original BrightFire.	



WGD

## WGD

Low NO<sub>x</sub> WGD burners are compact, water-cooled through-port burners designed to be inserted into the port neck of regenerative glass furnaces. Using a unique arrangement of converging flat jet nozzles, the burner produces a flat, fan-shaped luminous flame. This creates excellent flame coverage of the glass, ensuring high heat transfer and low NO<sub>x</sub>.

WGD	
Type	Throughport; regenerative
Capacity range	2000-12200 kW (7.6 – 45.8 MBTU/h)*
Max. process temperature	1650°C (3000°F)
Fuels	Natural gas
Key attributes Large capacities possible in a single burner - compact. Excellent flame coverage of glass. Low NO <sub>x</sub> . Reduced fuel consumption. Refractory savings.	



04V

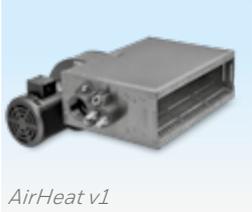
## 04V

The 04V is an adjustable air-gas nozzle-mixing burner, suitable for glass furnace applications ranging from small glass day tanks, float glass furnace working ends, refiners and distributors, to large multi-burner recuperative furnaces. 04V burners can be either side or end fired on several types of continuous furnaces.

04V	
Type	Recuperative
Capacity range	270-2670 kW (1 – 10 MBTU/h)*
Max. process temperature	1650°C (3000°F)
Fuels	Natural gas, fuel oil
Key attributes Hot/cold air. Combination fuel oil & gas. Adjustable for flame shape and capacity requirement.	

\* Capacities in kW refer to the lower calorific value  $H_u$  and capacities in BTU/h refer to the upper calorific value  $H_o$

## Line-style air heating and duct burners

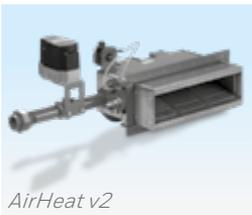


AirHeat v1

### AirHeat v1

AirHeat v1 is a compact modular burner, designed to generate a large volume of clean hot air for a wide range of industrial heating applications. All standard models feature an integrated combustion air blower mounted on the burner's steel case. By supplying the correct air volume and pressure to the burner, this blower allows stable operation over a wide range of duct velocities. Available with combustion air blowers mounted remotely from the burner (e.g. outside of the duct).

AirHeat v1	
Type	Nozzle-mixing
Number of sizes	Modular
Capacity range	260 kW/300 mm (1 MBTU/h/foot)*
Turndown	40:1
Max. process temperature	815°C (1500°F)
Fuels	Natural gas, propane
Key attributes Low CO emissions. Compact, modular design. Robust, reliable performance. Industry standard.	



AirHeat v2

### AirHeat v2

AirHeat v2 is a completely packaged line burner. Applications include ovens, driers, fume incinerators and similar industrial equipment. This burner provides simple, reliable operations, plus lower CO emissions than other competitive air heating burners. All standard models feature an integrated combustion air blower mounted on the burner's steel case. AirHeat v2 provides stable operation over a wide range of duct velocities without the need to install a profile plate. Available with combustion air blowers mounted remotely from the burner (e.g. outside of the duct).

AirHeat v2	
Type	Nozzle-mixing
Number of sizes	Modular
Capacity range	260 kW/300 mm (1 MBTU/h/foot)*
Turndown	40:1
Max. process temperature	815°C (1500°F)
Fuels	Natural gas, propane
Key attributes Extremely low CO emissions. Compact, modular design. Robust, reliable performance.	



RatioStar

### RatioStar

RatioStar is a modular duct burner designed with on-ratio control for direct fired air heating applications. Burners are configured in rows of up to 24 modules. Propagation modules connect individual burner rows to provide cross ignition. This modular design allows for a wide range of burner matrix configurations. Burner modules are built with high-quality stainless steel.

RatioStar	
Type	Nozzle-mixing
Number of sizes	Modular
Capacity range	125 kW/150 mm (470 kBTU/h/6 inches)*
Turndown	10:1
Max. process temperature	750°C (1400°F)
Fuels	Natural gas, propane
Key attributes Flexible design. Reliable with low air flow. Short flame length.	

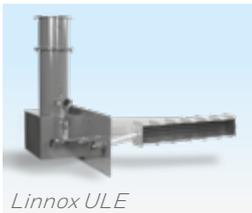


Minnox

### Minnox

The Minnox burner design utilizes a premixed gas/air mixture with excess air. The result is a cooler flame which produces a very low NO<sub>x</sub> discharge. The recirculating flame geometry acts to significantly reduce CO emissions. Minnox systems are typically supplied with the burner, mixer and supply manifold mounted into a duct section or as a side plate for insertion into existing process ductwork.

Minnox	
Type	Premix
Number of sizes	Modular
Capacity range	125 kW/150 mm (470 kBTU/h/6 inches)*
Turndown	10:1
Max. process temperature	800°C (1470°F)
Fuels	Natural gas, propane
Key attributes Industry leading ultra low emissions. <10 ppm NO <sub>x</sub> and <30 ppm CO emissions @ 3% O <sub>2</sub> . Short flame length.	



Linnox ULE

## Linnox ULE

Linnox ULE is designed for use in any direct or indirect fired air heating application requiring excellent heat distribution, temperature uniformity, low emissions and simple robust controls. Burner operation is based on a high excess air pre-mix combustion that keeps flame temperatures low while burner geometry establishes an internal recirculation flame pattern. This allows for extremely low emissions at a high turndown rate (10:1) while maintaining stable combustion.

Linnox ULE	
Type	Pre-mix
Number of sizes	12/modular
Capacity range	24 – 720 kW/300 mm (90 – 2700 kBTU/h/foot)*
Turndown	10:1
Max. process temperature	800°C (1470°F)
Fuels	Natural gas
Key attributes Ultra low emissions. Less than 15 ppm NO <sub>x</sub> and 100 ppm CO at 3% O <sub>2</sub> with simple controls. Very short flame length.	

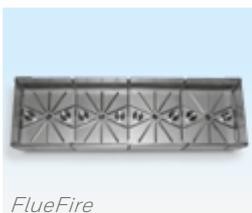


AH-MA

## AH-MA

AH-MA is a line-type burner, ideal for heating fresh air in make-up and process air heating applications. The burner operates over a wide range of velocities, inputs and fuels. AH-MA produces a uniform, odourless, smokeless flame, while optimizing emissions and efficiency. In addition, corrosion resistant options are available using aluminium or nickel-plated cast iron burner bodies.

AH-MA	
Type	Nozzle-mixing
Number of sizes	Modular
Capacity range	350 kW/300 mm (1.2 MBTU/h/foot)*
Turndown	30:1
Max. process temperature	450°C (850°F)
Fuels	Natural gas, propane, butane
Key attributes Robust, reliable performance. Compact, modular design.	



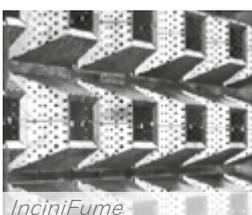
FlueFire

## FlueFire

FlueFire is an in-duct burner designed for supplemental firing in cogeneration and combined-cycle installations. The burner is also suitable for fresh air operation or incineration applications. The FlueFire takes its oxygen requirement from the turbine exhaust gases. The burner can function with inlet temperatures up to 700°C (1300°F) and outlet temperatures up to 1200°C (2200°F).

FlueFire	
Type	Nozzle-mixing
Number of sizes	Modular
Capacity range	340 kW/150 mm (1275 kBTU/h/6 inches)** *
Turndown	10:1
Max. process temperature	1200°C (2200°F)
Fuels	Natural gas, propane, butane
Key attributes Clean combustion with low NO <sub>x</sub> . Exceptional flame stability. Meets changing heat demands while maintaining uniform temperature distribution.	

\*\*Subject to exhaust gas oxygen level.



InciniFume

## InciniFume

InciniFume is a modular in-duct burner. The burner uses the oxygen within the exhaust flow to complete the combustion process. The short flame and uniform temperature distribution make it ideal for a variety of industrial processes requiring large heat inputs and high outlet temperatures. The burner can be assembled in straight sections, t- sections or crosses.

InciniFume	
Type	Nozzle-mixing
Number of sizes	Modular
Capacity range	250 kW/300 mm (940 kBTU/h/foot)** *
Turndown	10:1
Max. process temperature	950°C (1750°F)
Fuels	Natural gas, propane, butane
Key attributes Short flame and uniform temperature distribution.	

\*\*Subject to exhaust gas oxygen level

\* Capacities in kW refer to the lower calorific value  $H_v$  and capacities in BTU/h refer to the upper calorific value  $H_o$

## Air heating burners



RatioMatic

### RatioMatic

RatioMatic is a packaged air heating burner that features simple operation and robust, reliable performance. The ratio regulator and direct drive air butterfly valve simplify start-up and adjustment. The fast mixing nozzle provides clean, stable flame at all firing rates. RatioMatic delivers high fuel efficiency and low NO<sub>x</sub>, CO and aldehyde outputs. The design of the RatioMatic makes it easy to install, operate and maintain.

RatioMatic	
Type	Nozzle-mixing
Number of sizes	14 (size 50 – 3000)
Capacity range	135 – 8000 kW (0.5 – 30 MBTU/h)*
Turndown	21:1 up to 100:1
Max. process temperature	1038°C (1900°F)
Fuels	Natural gas, propane, butane
Key attributes	
Easy set-up.	
No gas adjustment with ratio control.	
Optional burner lengths to accommodate various oven wall thicknesses.	
Robust, reliable performance.	



Winox

### Winox

Winox is designed to comply with global emissions regulations. Easy to set up and operate, the low NO<sub>x</sub> Winox burner is ideal for air heating and oven applications. Winox features an intense, short, swirled flame that is completely contained within the firing tube. The nozzle creates an intense mixing of air and fuel, resulting in extremely low emissions.

Winox	
Type	Nozzle-mixing
Number of sizes	8 (size 50 – 850)
Capacity range	147 – 3330 kW (550 – 12500 kBTU/h)*
Turndown	7:1 up to 17:1
Max. process temperature	982°C (1800°F)
Fuels	Natural gas, propane, butane
Key attributes	
Robust, reliable performance.	
5 – 20 ppm NO <sub>x</sub> emissions at 3% O <sub>2</sub> .	
Simple operation.	
Safe and reliable.	
Very short flame.	



ThermAir

### ThermAir

ThermAir is a nozzle-mixing burner with a packaged air blower that is designed to fire with fixed combustion air over a wide turndown range. The burner is simple to set up and adjust. ThermAir burners are ideal on heaters, textile ovens and in situations where the fuel is highly variable (800 BTU/cf to 3200 BTU/cf). This burner is perfect for ovens needing additional air to carry moisture away from the product being heated.

ThermAir	
Type	Nozzle-mixing
Number of sizes	9 (size 15 – 500)
Capacity range	40 – 1340 kW (150 – 5000 kBTU/h)*
Turndown	30:1
Max. process temperature	1038°C (1900°F)
Fuels	Natural gas, propane, butane, landfill gas, low BTU gases
Key attributes	
Easy set-up and operation.	
Modulating gas control.	
Wide range of fuels.	



RatioAir

## RatioAir

RatioAir is a premium air heating burner ideally suited for applications that require a velocity burner with an integrated packaged blower and ratio control. RatioAir burners can deliver flame speeds of up to 150 m/s (500 ft/s) to deliver improved temperature uniformity, product quality and system efficiency. It also permits the use of low BTU fuels.

RatioAir	
Type	Nozzle-mixing
Number of sizes	11 (size 25 – 2000)
Capacity range	71 – 5330 kW (266 – 20400 kBTU/h)*
Turndown	30:1
Max. process temperature	1538°C (2800°F)
Fuels	Natural gas, propane, butane, landfill gas, low BTU gases
Key attributes Packaged velocity burner. Ratio control plus high excess air. Alloy, ceramic and refractory block combustor options. Wide range of fuels.	



Incini-Cone

## Incini-Cone

Incini-Cone burners are designed for fume incineration and the after-heating of exhaust from turbines, driers, ovens and similar equipment. The burner is mounted in the exhaust duct and requires the exhaust stream to supply all of the oxygen needed for complete combustion.

Incini-Cone	
Type	Nozzle-mixing
Number of sizes	9 (size 136 – 2960)
Capacity range	400 – 8600 kW (1500 – 32200 kBTU/h)*
Turndown	26:1
Max. process temperature	900°C (1650°F)
Fuels	Natural gas, propane, butane, #2 fuel oil
Key attributes High turndown. Compact design. Minimal maintenance. Raw gas pilot.	



HeatPak

## HeatPak

Completely pre-assembled and pre-wired burner packages based on either RatioMatic, RatioAir or ThermAir with mounted fan, gas safety and control system and automatic burner control unit for applications in industry.

Thanks to their compact design, both conversion of existing systems and initial installation can be implemented within a very short time. Control is carried out using air/gas ratio control (RMHP and RAHP) or gas-only control (TAHP) using linear flow control LFC in the gas circuit with a constant air volume.

RatioMatic HeatPak RMHP	
Number of sizes	5 (size 02, 03, 05, 07, 11)
Capacity range	200 – 1100 kW (756 – 4160 kBTU/h)
Fuels	Natural gas, propane, butane

RatioAir HeatPak RAHP	
Number of sizes	5 (size 01, 02, 03, 06, 09)
Capacity range	100 – 900 kW (380 – 3400 kBTU/h)
Fuels	Natural gas, propane, butane

ThermAir HeatPak TAHP	
Number of sizes	6 (size 01, 02, 03, 05, 09, 10)
Capacity range	100 – 1045 kW (380 – 3950 kBTU/h)
Fuels	Natural gas, propane, butane

\* Capacities in kW refer to the lower calorific value  $H_v$  and capacities in BTU/h refer to the upper calorific value  $H_o$

## Immersion burners



### ImmersoJet

ImmersoJet is a nozzle-mixing, tube-firing burner designed to fire at high velocities through a small diameter immersion tube in immersion heating tanks. The combustion gases from the burner scrub the inner tube surfaces to produce a high heat transfer rate and fast heat-up times. The high velocity flow through the smaller diameter tubes allows for system efficiencies in excess of 80%.

ImmersoJet	
Type	Nozzle-mixing
Number of sizes	5 (2", 3", 4", 6", 8")
Capacity range	51 – 2130 kW (190 – 8000 kBTU/h)*
Turndown	7:1 minimum
Fuels	Natural gas, propane, butane
Key attributes Up to 80% efficiency. Allows the use of smaller, lower cost tubes.	

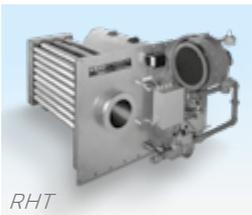


### ImmersoPak

The ImmersoPak burner is ideal for heating immersion tubes on cleaning tanks, spray washers, salt baths, quenching tanks, tempering tanks, asphalt tanks and similar equipment. ImmersoPak is easy to install, simple to operate, and offers durability and long service life in industrial environments. It delivers smooth, quiet performance, even during cold starts.

ImmersoPak	
Type	Nozzle-mixing
Number of sizes	6 (4", 5", 6", 8", 10", 12")
Capacity range	72 – 1090 kW (270 – 4100 kBTU/h)*
Turndown	4.5:1 minimum
Fuels	Natural gas, propane, butane
Key attributes Up to 80% efficiency. Easy set-up with no gas adjustment. Compact, modular design.	

## Indirect air heaters



### Indirect air heaters RHT

Indirect air heaters RHT are designed to heat recirculating ovens and driers where the products of combustion must be isolated from the process air stream. They are also excellent for use in industrial space heating systems. The firing chamber and exhaust tubes are assembled as a single unit for easy installation and optimum performance.

Indirect air heater RHT	
Type	Indirect air heater
Number of sizes	9
Capacity range	50 – 800 kW (170 – 2730 kBTU/h)*
Max. process temperature	290°C (550°F)
Fuels	Natural gas, propane, butane
Key attributes Separates products of combustion from process air stream. Easy maintenance. Meets NFPA 86 requirements.	



### Indirect air heaters ER

Indirect air heaters ER are ideal for heating and drying applications requiring contaminant-free process air. Typical applications include pharmaceutical spray driers, chemical driers and drying ovens. In addition, component options are available to meet demanding dairy industry requirements.

Indirect air heater ER	
Type	Indirect air heater
Number of sizes	9
Capacity range	240 – 4560 kW 1580 – 82200 Nm <sup>3</sup> /h (900 – 17100 kBTU/h) (1000 – 52100 scfm)
Max. process temperature	420°C (780°F)
Fuels	Natural gas, propane, butane
Key attributes Complete packaged solution. Clean process air – free from products of combustion. High efficiency. Ultra-low emission burner options.	



ZMI



ZKIH



ZIO 40



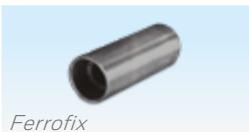
ZAI



Blast tips



Sticktite



Ferrofix



ZTA



ZT 40..A



ZT 40../100



ZTI 55



S11T

## Pilots, open burner nozzles and thermoelectric safety devices

### Ionization pilot burner

#### Pilot burners with ionization control

For safely igniting gas burners.

#### ZAI

Atmospheric pilot burner.

Gas types: natural gas, propane; other gas types on request.

#### ZMI

With forced air supply.

Gas types: natural gas, propane, coke oven gas.

#### ZKIH

With forced air supply.

Gas types: natural gas, propane, coke oven gas.

#### ZIO 40

With forced air supply.

Gas types: natural gas, propane, coke oven gas.

Burner	Capacity	
	kW	kBTU/h*
ZAI	3	11
ZMI 16	1 - 2	3.8 - 7.6
ZMI 25	2.5 - 4	9.5 - 15
ZKIH	2 - 7	7.6 - 26
for natural gas	max. 5	max. 17
ZIO 40	up to 20	up to 76

### Open burner nozzles

#### Blast tips

Small burners for use in groups to heat a wide area. For use as pipe burners with pre-mixed air/gas.

Type	Pre-mix
Number of sizes	4 (0.38 - 1 inch)
Capacity range	0.8 - 2.9 kW (3 - 11 BTU/h)

#### Sticktite burner nozzles

Open-type burner nozzle with built-in flame retention. For use with air/gas mixers.

Type	Pre-mix
Number of sizes	10 (0.5 - 6 inch)
Capacity range	10 - 1400 kW (37 - 5250 kBTU/h)

#### Ferrofix burner nozzles

Open-type burner nozzle with built-in flame retention. For use with air/gas mixers.

Type	Pre-mix
Number of sizes	13 (0.25 - 6 inch)
Capacity range	2 - 1520 kW (6 - 5700 kBTU/h)

### Thermo pilot burner

For safe ignition and thermoelectric safeguarding in conjunction with control valve S11T of gas burners in applications without voltage supply.

Gas types: natural gas, LPG, coke oven gas.

#### ZTA

Atmospheric pilot burner.

#### ZT 40

ZT 40..A: atmospheric,  
ZT 40../100: with forced air supply.

#### ZTI 55

Atmospheric pilot burner with ionization electrode.

Burner	Capacity	
	kW	kBTU/h*
ZTA	1	3.8
ZT 40	1	3.8
ZTI 55		
with natural gas	3.3	12.0
with LPG	2.5	9.5
with town gas	2.3	8.7

#### Control valve S11T

The control valve S11T operates independently of the mains power supply. The control valve S11T..S is also available with a switch to control an ignition transformer.

Inlet pressure: max. 1500 mbar.

\* Capacities in kW refer to the lower calorific value  $H_v$  and capacities in BTU/h refer to the upper calorific value  $H_o$

# Overview

Multi-burner high-temperature applications burner for central combustion air fan	
	<p><b>Direct fired furnace burner</b></p> <ul style="list-style-type: none"> <li>• BIO, ZIO</li> <li>• BIC, ZIC</li> <li>• BIC..M</li> <li>• BIC..L</li> <li>• BIC..R</li> <li>• ThermJet</li> <li>• BBG</li> <li>• ExtensoHeat</li> <li>• Furnnox</li> <li>• TriOx</li> </ul>
	<p><b>Self recuperative and radiant tube burners</b></p> <ul style="list-style-type: none"> <li>• ECOMAX</li> <li>• TJSR</li> <li>• SER</li> <li>• TFB</li> <li>• BU</li> <li>• FGR</li> </ul>
	<p><b>Oxy-fuel burners and burners for the glass industry</b></p> <ul style="list-style-type: none"> <li>• PrimeFire® 100, 300 and 400</li> <li>• PrimeFire® Forehearth</li> <li>• BrightFire® 200</li> <li>• WGD</li> <li>• O4V</li> </ul>

Low-temperature applications burners with individual combustion fan	
	<p><b>Line-style air heating and duct burners</b></p> <ul style="list-style-type: none"> <li>• AirHeat v1 and v2</li> <li>• RatioStar</li> <li>• Minnox</li> <li>• Linnox ULE</li> <li>• AH-MA</li> <li>• FlueFire</li> <li>• InciniFume</li> </ul>
	<p><b>Air heating burners</b></p> <ul style="list-style-type: none"> <li>• RatioMatic</li> <li>• Winnox</li> <li>• ThermAir</li> <li>• RatioAir</li> <li>• Incini-Cone</li> </ul>
	<p><b>Immersion burners</b></p> <ul style="list-style-type: none"> <li>• ImmersoJet</li> <li>• ImmersoPak</li> </ul>
	<p><b>Indirect air heaters</b></p> <ul style="list-style-type: none"> <li>• RHT</li> <li>• ER</li> </ul>

## Contact

www.kromschroeder.com → Process Heat → Sales  
 Elster GmbH  
 Strothweg 1 · 49504 Lotte (Büren)  
 Germany  
 Tel. +49 541 1214-0  
 hts.lotte@honeywell.com  
 www.kromschroeder.com

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