raadman

DB – Series Industrial burners

From 700 kW up to 32000 kW

www.packmangroup.com
www.raadman-burner.com

More than

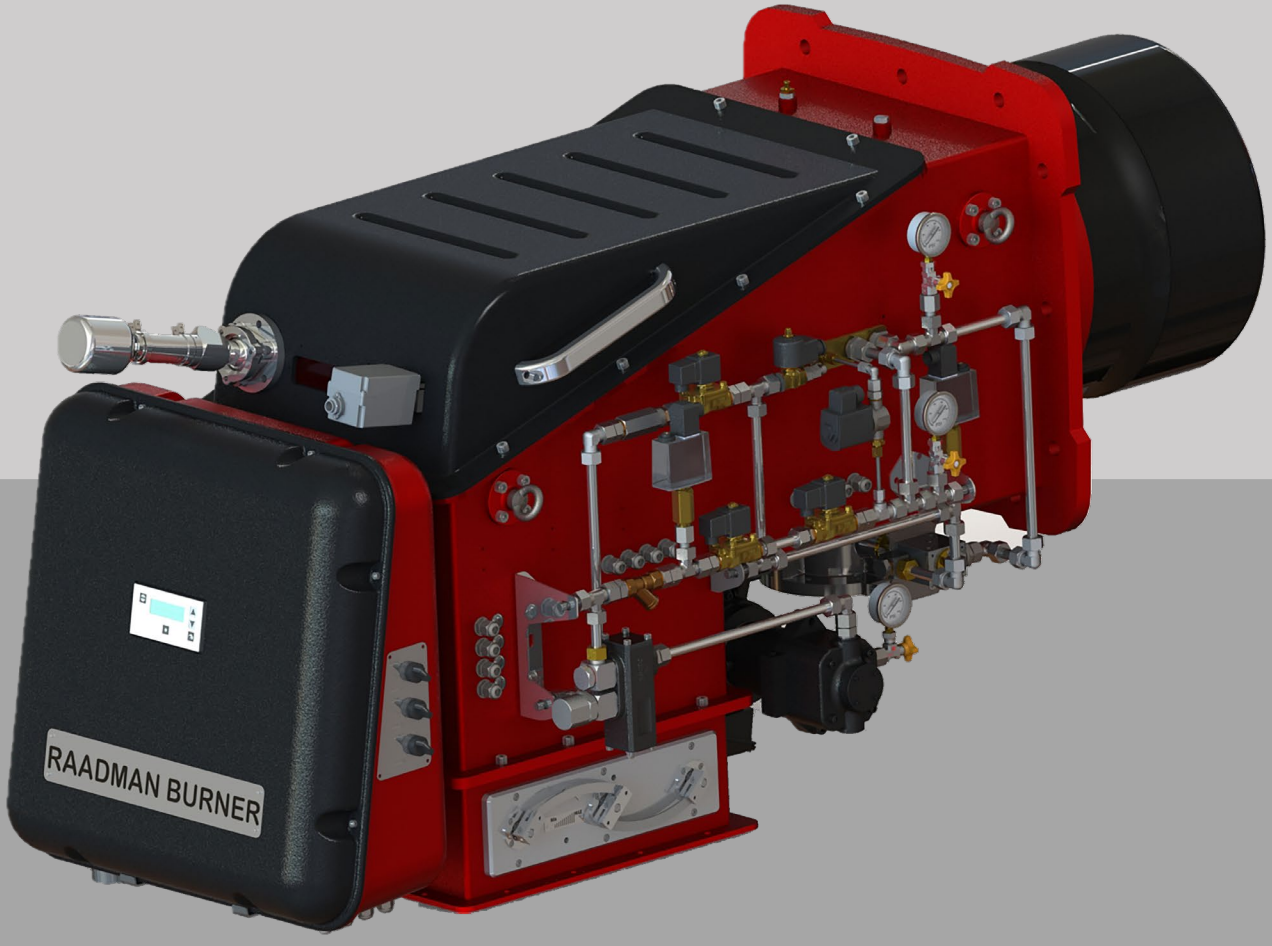
48 Years of Reliability

History

The PACKMAN Company was established in February of 1975. This company started its official activity in the field of construction of High-Pressure Vessels such as Hot-Water Boilers, Steam Boilers, Pool Coil Tanks, Softeners and Heat Exchangers from 1984. As the first supplier of Hot water boilers with high quality and standard mark, PACKMAN has started exporting its products to countries such as Uzbekistan, United Arab Emirates and other countries in the region. Currently, PACKMAN honorfully is one of the largest producers of hot-water and steam boilers in the Middle East.

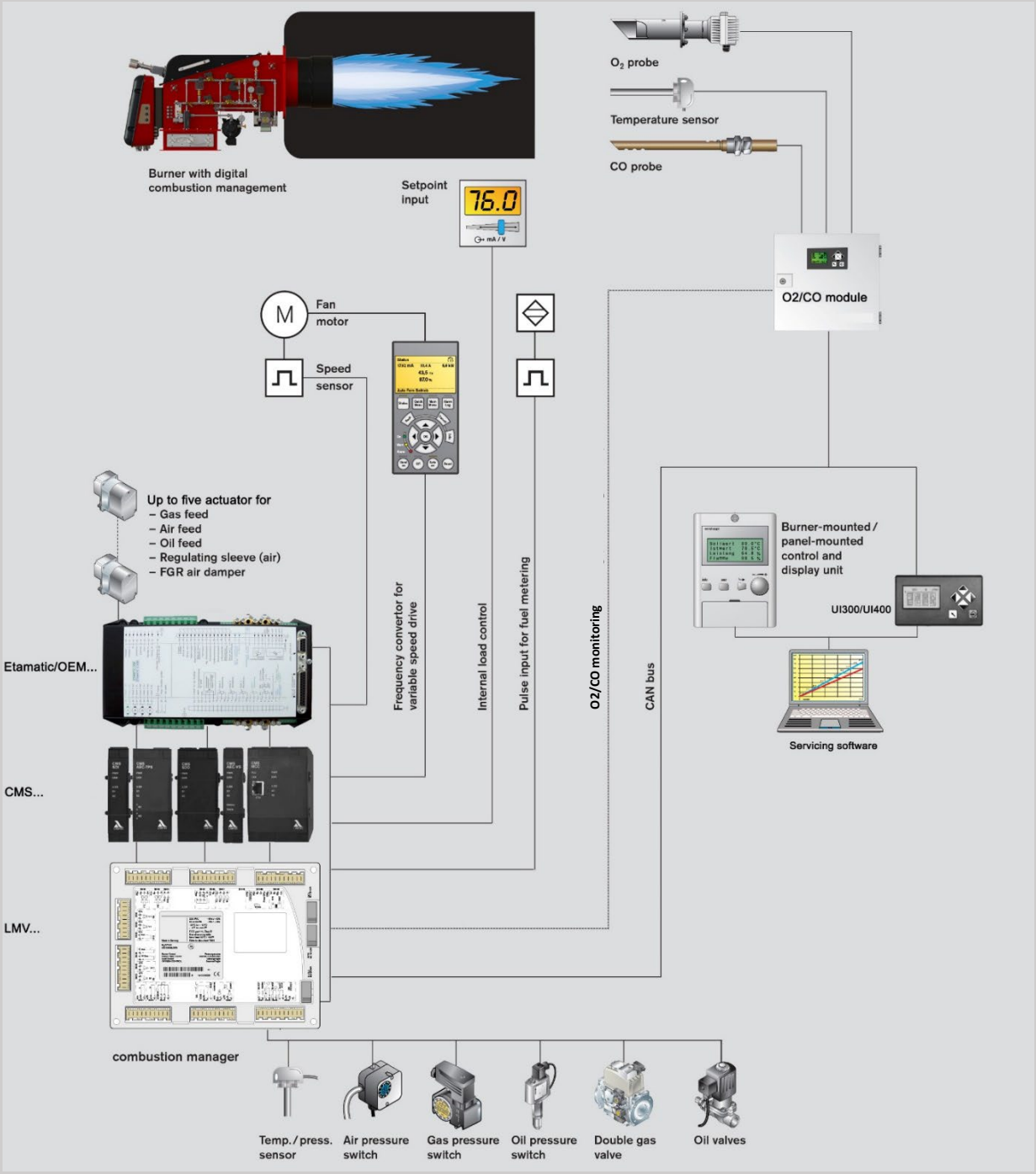
After 40 years of experience in the field of heating industry, especially boilers and burners, this group started his activity on January 2011 in the area of burners with brand of RAADMAN. The main objective of this group was improvement and development of industrial burners in order to produce high quality and high efficient industrial burners with optimum operation in the Middle East. Based on technical knowledge and engineering design of industrial burners, PACKMAN Corporation started the production of low and medium sized industrial burners. By the efforts of engineers of R&D department, the burner's combustion improved significantly and as a consequence, the production of burners developed rapidly. Gas, Light oil and Dual fuel burners with different firing ranges were produced and tested successfully.

Nowadays the burners of this company cover a firing range of 100 to 40000 kW. Single stage, double stage, modular and Low NOx burners (generally lower than 80 mg/kWh and individually lower than 40 mg/kWh) are available for various domestic and industrial applications. High quality, optimum operation and customer satisfaction has always been considered in the production of RAADMAN burners. Diversity and high quality of RAADMAN burners, besides their easy installation and maintenance make them a perfect selection for customers



Electronic modular operation

Full electronic modulating burners are designed to safely operate throughout its firing range from high fire to low fire. The most common turndown ratings in **DB-Series** burner are 1:8 up to 1:10. High turndown is used to reduce the burner cycling and maintain a consistent temperature or pressure in the boiler. This is crucial if the boiler is used in an industrial process that requires a consistent temperature or pressure. **DB-Series** burners are equipped with an electronic microprocessor management panel, which controls the air damper servomotor, fuel servomotors as well as head regulating sleeve. Using electronic modulation, hysteresis is prevented by the precise control of the separated in independent servomotors and the software linked by can - bus. The LAMTEC ETAMATIC / CMS combustion managers or Siemens LMV51/52, as the most popular brands, are frequently used in **DB-Series** RAADMAN Modular burners. This burner Control System combines the benefits of an electronic fuel/air ratio controller with an electronic burner control unit. Up to five motorized actuators can be assigned to modulate air and fuel drives with the option of an additional module to add variable speed drive control for the combustion air fan.

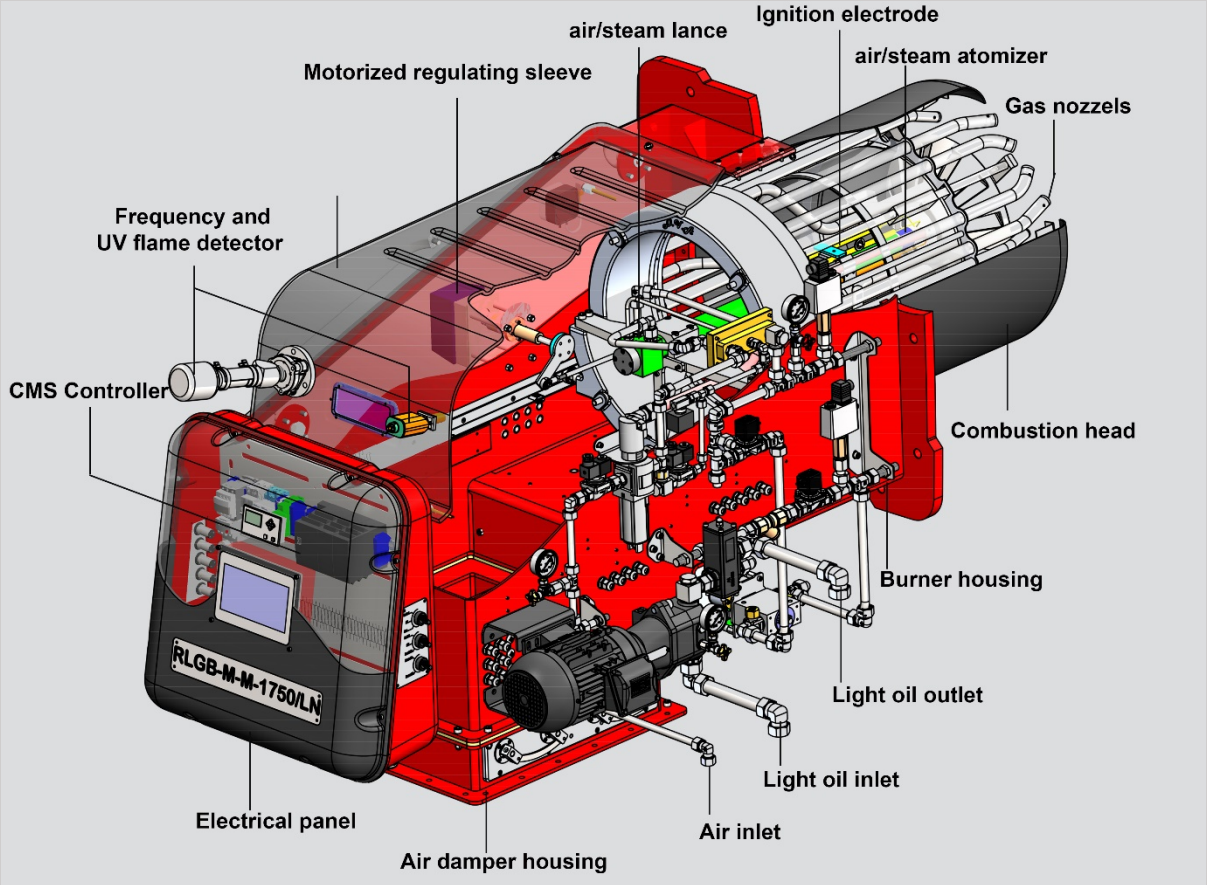


Additional modules are available for field bus interfacing, load control and dual fuel operation.

These modular systems includes many standard burner functions as standard, these include: integrated valve proving, ambient temperature compensation, flame monitoring and operating hours and system start-up counters. Oxygen trim, CO control, load control and dual fuel functionality are all available options that are used to further enhance system benefits, flexibility and efficiency. These controllers particularly suited for use on mono-bloc burners

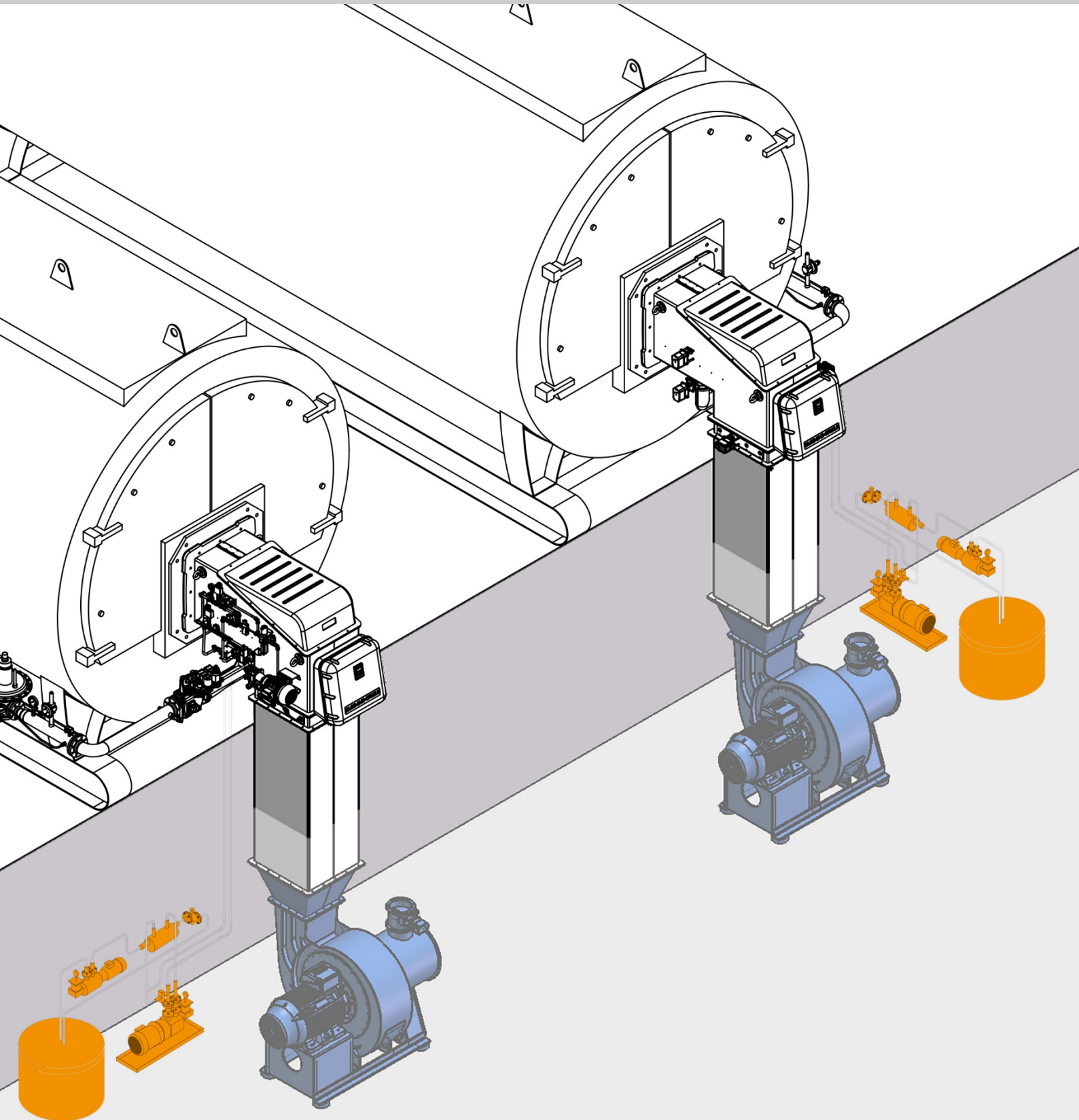
Key features and benefits include:

- Integrated linkage-less control, burner flame safeguard and modulation PID control
- Single or dual fuel application
- Controls up to 5 independent actuators for optimal efficiency in low NOx burner application.
- Integrated PID temperature/ pressure controller with auto tune for extremely accurate process control
- Variable Speed Drive control with actual RPM speed sensor provides reliable, efficient and safe control of the combustion air blower
- Integrated gas valve proving system that checks for leak on every burner cycle for increased safety.
- Optional O2-CO trim
- Up to 10 programmable points per fuel-air ratio curve for greater flexibility and tighter control
- 999 highly repeatable actuator position for precise control
- Digital positioning feedback from actuators ensure unmatched repeatability
- Independent ignition position
- Ability of being connected to building management system using different type of protocols
- World-wide approvals and technical supports

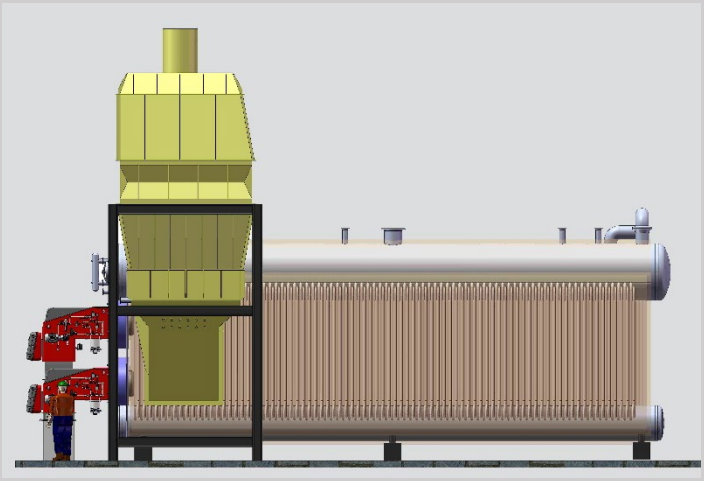


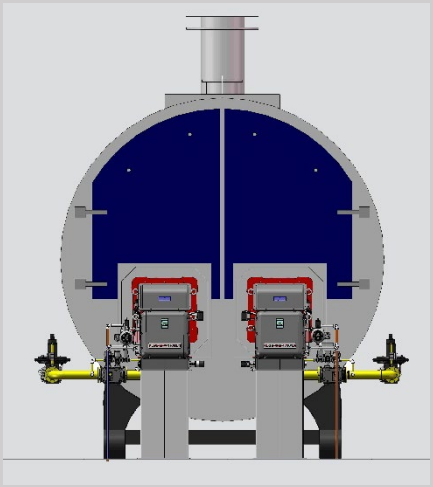
Perfectly matched components by:

Ability of installing the second burner bloc as well as fuel combustion accessories on the other floors.

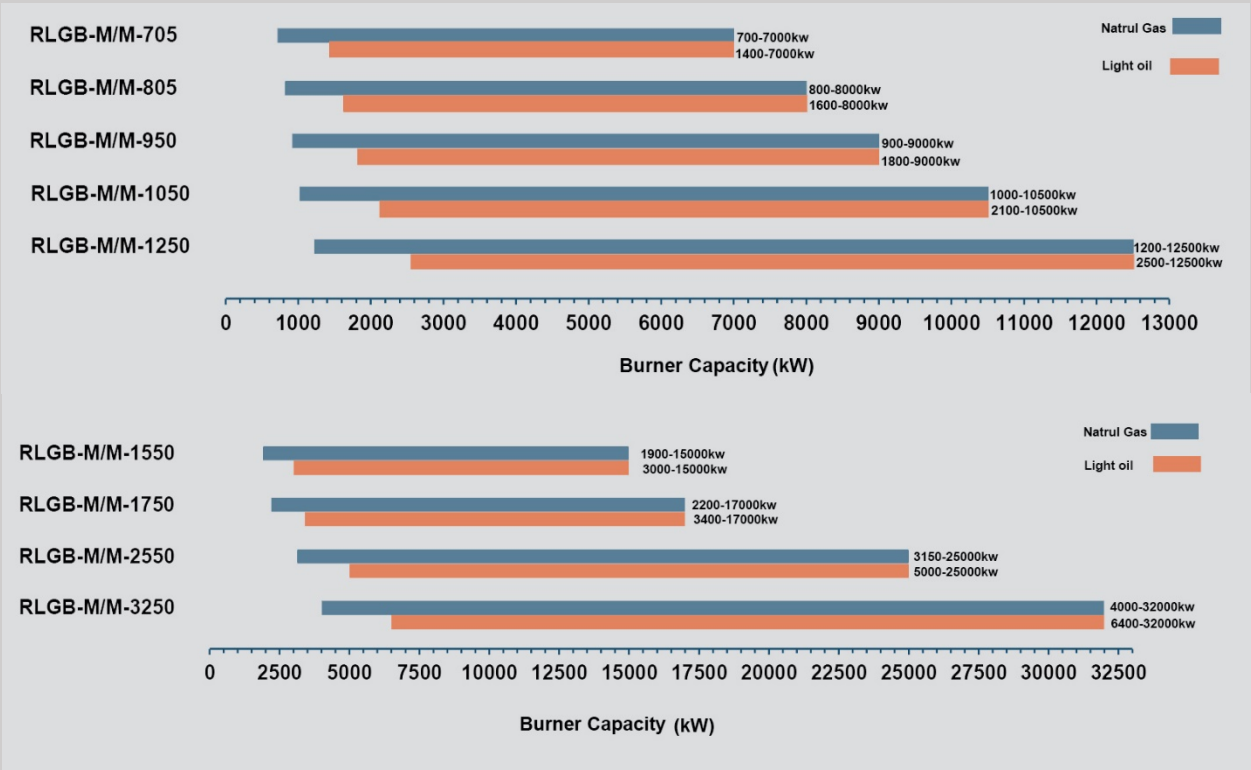


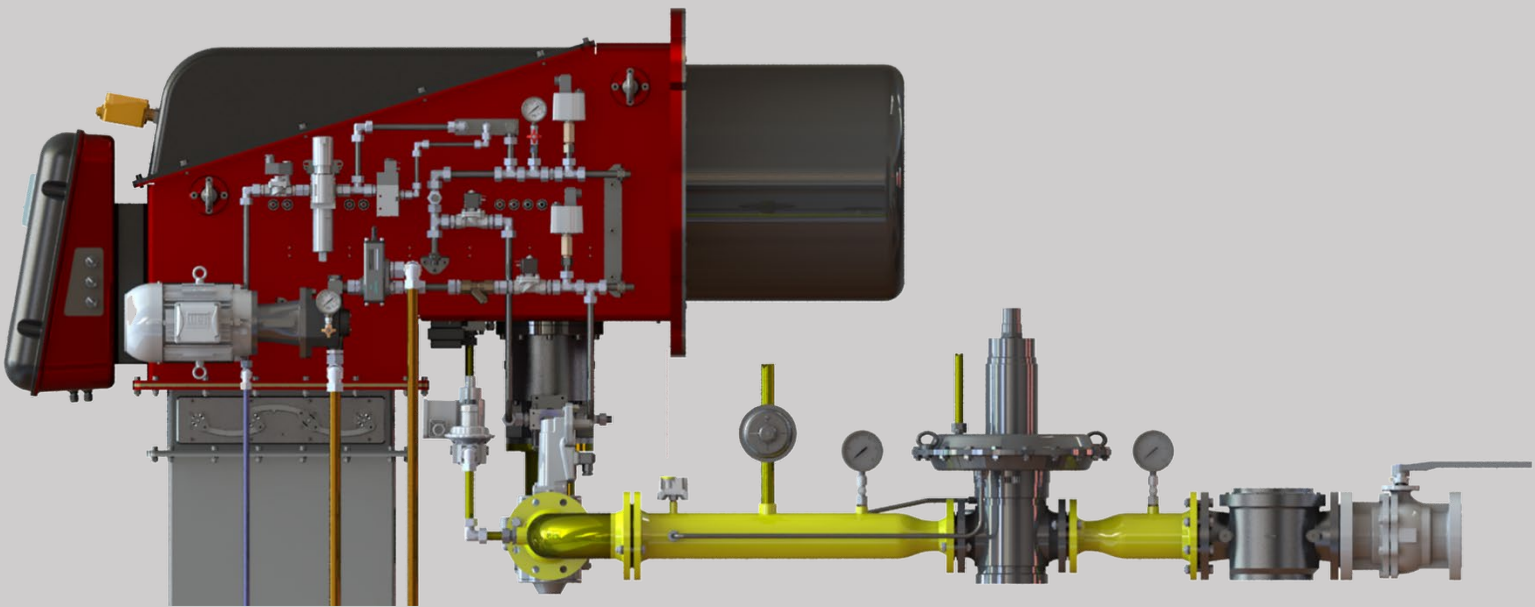
For all purposes and possibilities:





Firing ranges:

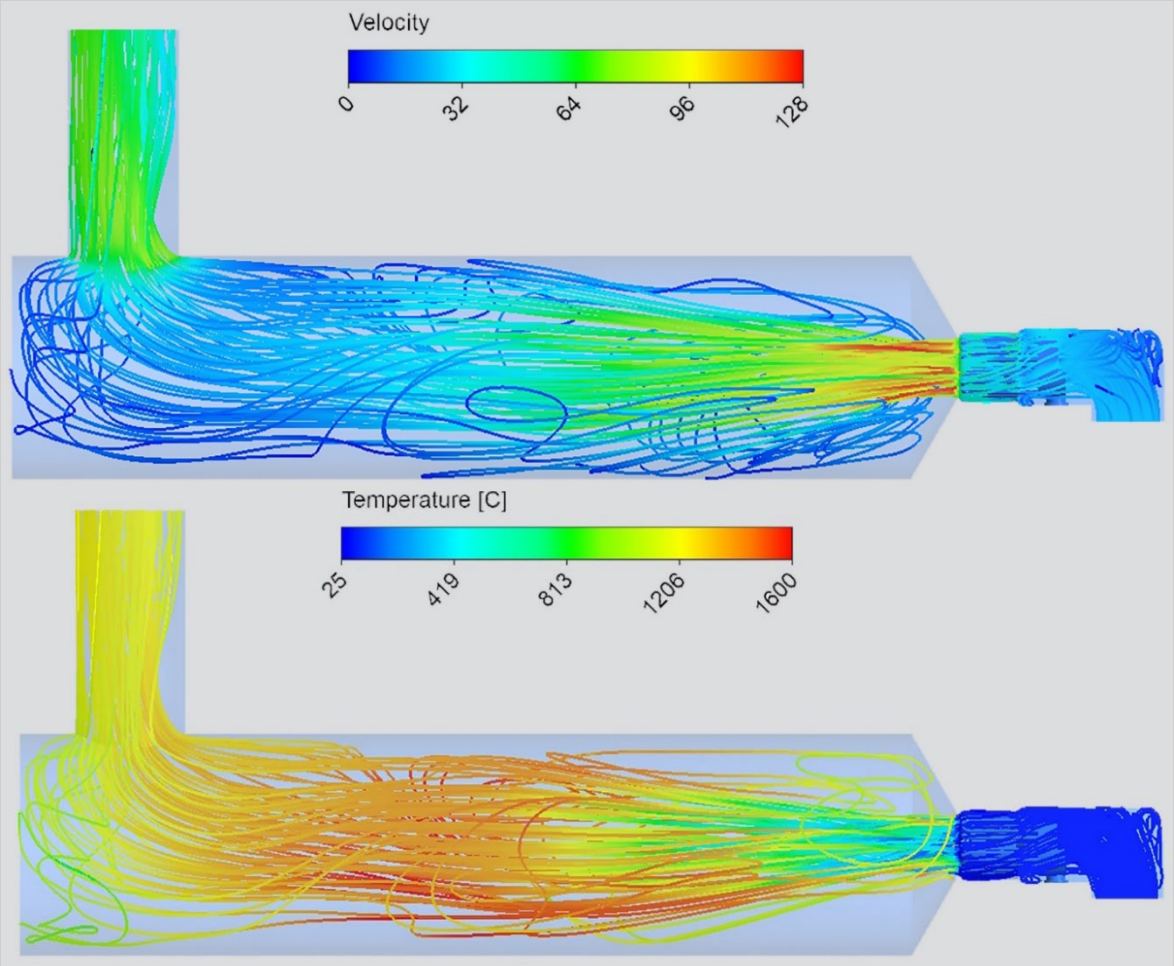




CFD experts in R&D department

Industry relies on heat from the burners in all combustion systems. Optimizing burner performance is critical to complying with stringent emissions requirements and to improve industrial productivity. Engineers involved in designing and building advanced combustion equipment for the hydrocarbon process industries routinely use Advanced CFD to advance new burner technology. The science and technology of CFD has matured to the point where performance predictions are made with a degree of confidence from models covering a wide range of complex furnace, burner, and reactor geometries. While tremendous advances have been made in understanding the fundamentals of combustion, the remaining challenges are complex. To make improvements, it is critical to understand the dynamics of the fuel fluid flow and the flame and its characteristics. Computational Fluid Dynamics offers a numerical modelling methodology that helps in this regard. Commercial CFD codes utilize a standard approach to simulate chemical kinetics, which approximate the consumption and production of chemical species. This causes the engineer to use simplifying assumptions about the chemistry considered in the simulation. While this simplified chemistry includes adequate information to predict flow patterns and local heat transfer, these models lack sufficient information to accurately predict NOx and CO production. Alternatively, the NOx chemistry is decoupled from the main calculation and obtained using post-processing techniques. CFD coupled with cold-flow physical modeling and hot-flow burner tests provides a powerful analytical tool to develop accurate, timely, and cost-effective burner designs.

Packman R&D Department is accustomed to working on custom engineered solutions, and our sales applications and thermofluidic engineering department are ready to assist with complex applications. As part of our design and engineering process, we have the ability to use Computational Fluid Dynamics (CFD) modeling to predict product performance or adjust product design prior to burners being installed in the field.

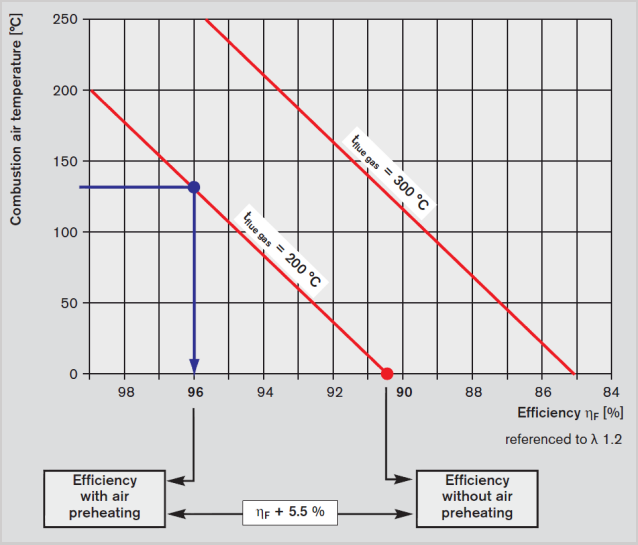


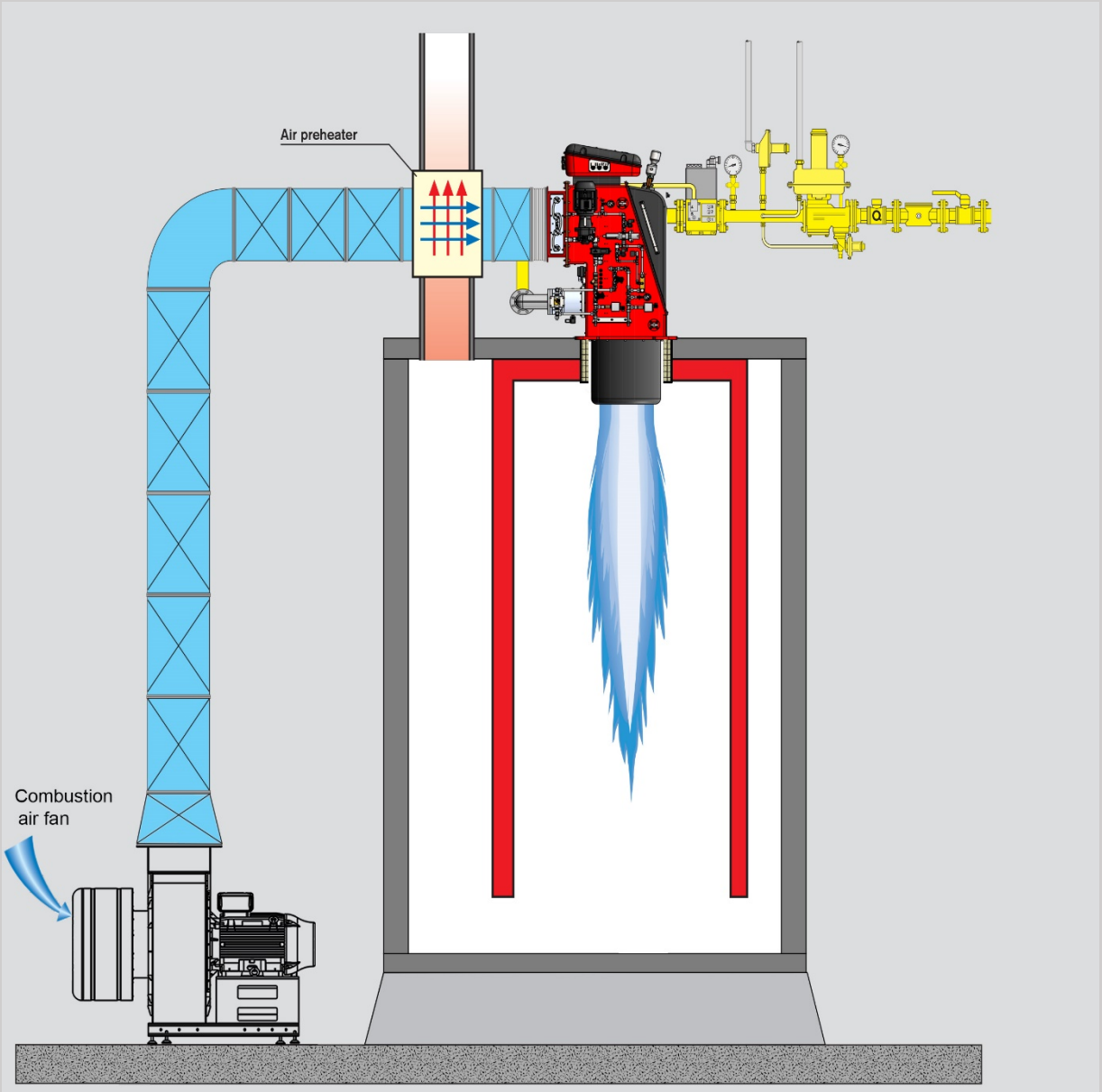
Heat generators with very high medium temperatures can exploit less of the heat in the flue gases. Consequently, flue gas temperatures are always higher than the medium temperature. Without additional heat exchangers, a lot of energy will be lost to the atmosphere and wasted. One way of utilizing this energy is through the use of hot-air versions of the DB-series dual-bloc burners.

A cross-flow heat exchanger between the combustion air duct and the flue gas system draws heat from the hot flue gas and transfers it to the combustion air. Using this method, combustion air can be heated to temperatures of up to 250 °C, making efficiency increases of up to 10 percent possible.

Despite these extreme conditions, the burners can achieve NOx values in the range of 100–150 mg/Nm³.

Efficiency increases of up to 10 percent with 250 °C hot-air in DB-Series burners





FGR Technology

Flue gas recirculation (FGR) can be a highly effective technique for lowering NOx emissions from burners, and it's relatively inexpensive to apply. Most of the early FGR work was done on boilers, and investigators found that recirculating up to 25% of the flue gases through the burner could lower NOx emissions to as little as 25% of their normal levels.

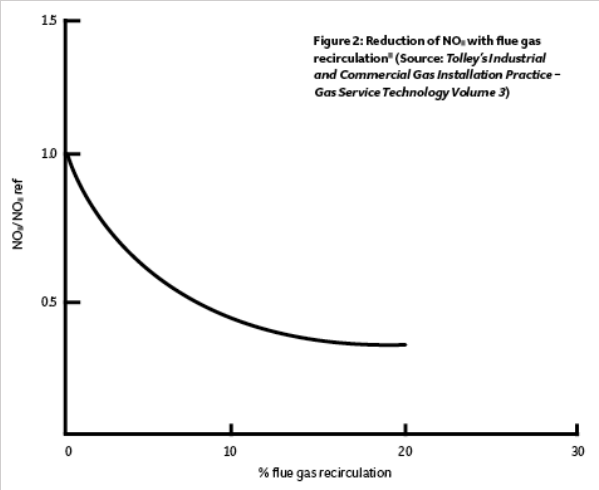
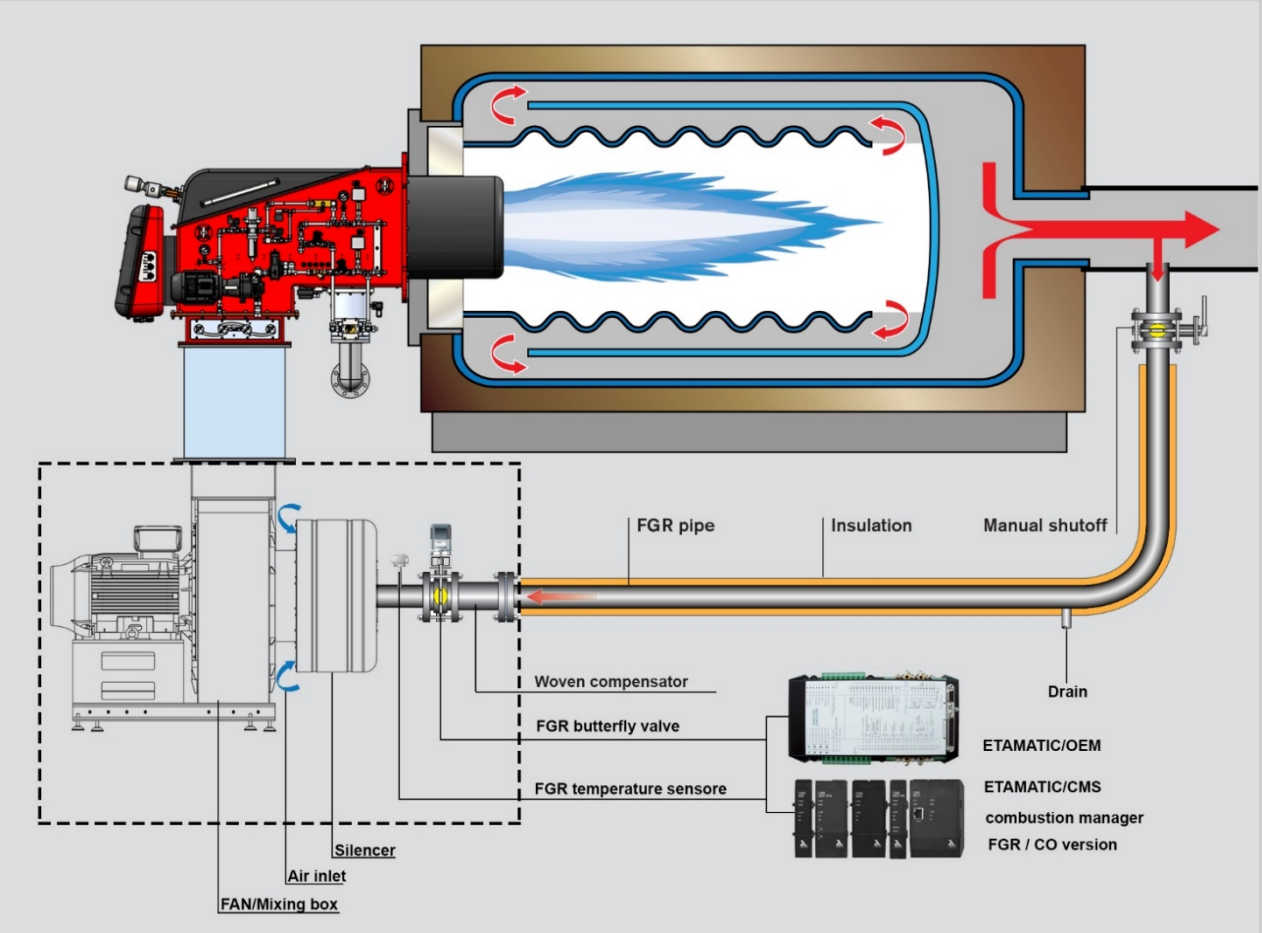
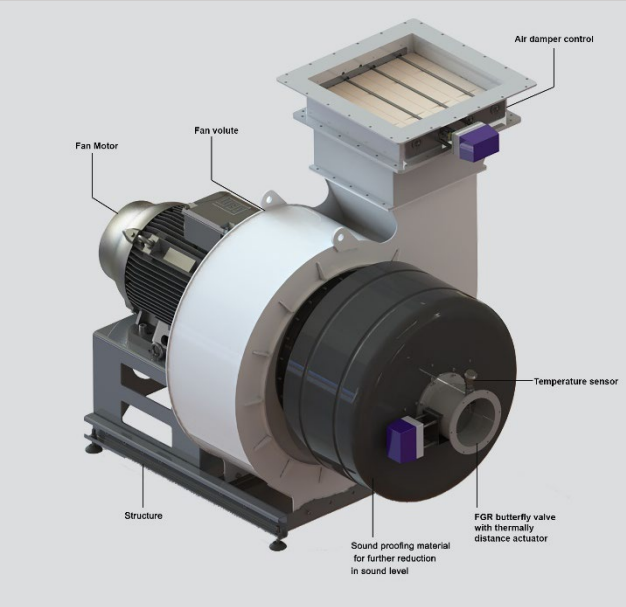


Figure 2: Reduction of NO_x with flue gas recirculation[8] (Source: *Tolley's Industrial and Commercial Gas Installation Practice – Gas Service Technology Volume 3*)

With FGR technology, consisting of temperature sensor and flue gas damper with actuator both connected on a flange, a portion of the exhaust (flue) gas circulates back into the combustion zone to decrease the flame temperature and reduce nitrogen-oxide (NOx).

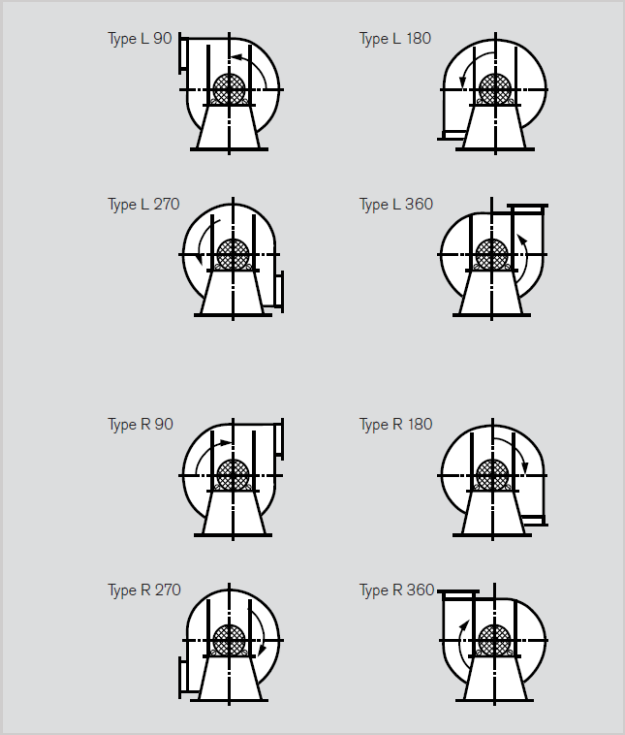
When FGR is used, because of reduction in radiation heat transfer, boiler efficiency may decrease, typically in the range of 0.25 percent to 1 percent, depending on the amount of FGR added. Plant experience shows that the combination of low NOx burners with re-burning using FGR system, reduces the NOx level to approximately lower than 40 mg/kWh.

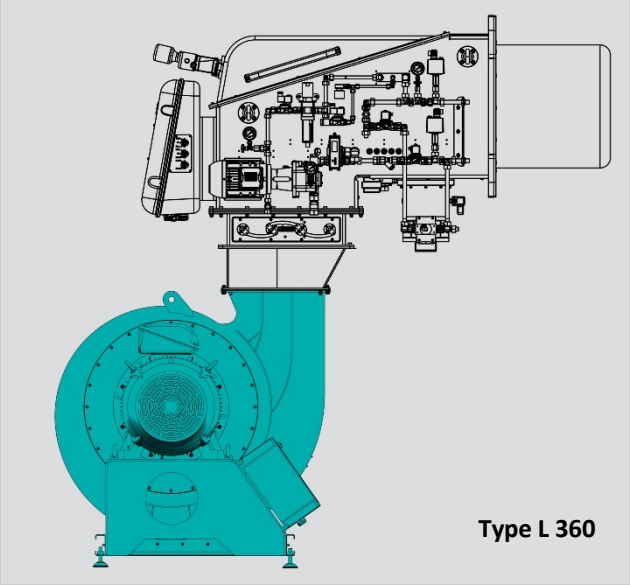




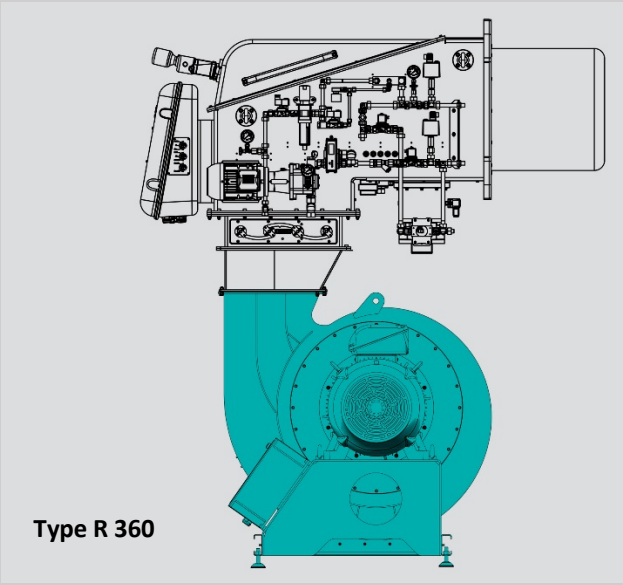
Note: The housing arrangement is to be considered as viewed from the drive side of the fan. Subsequent alteration of the alignment of the fan to its base is not possible, as the two parts are welded together during manufacture.

The likelihood of 8 housings arrangement based on the customer request.

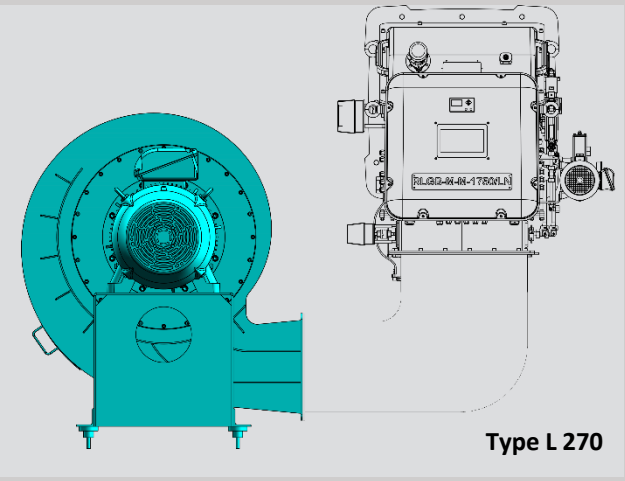




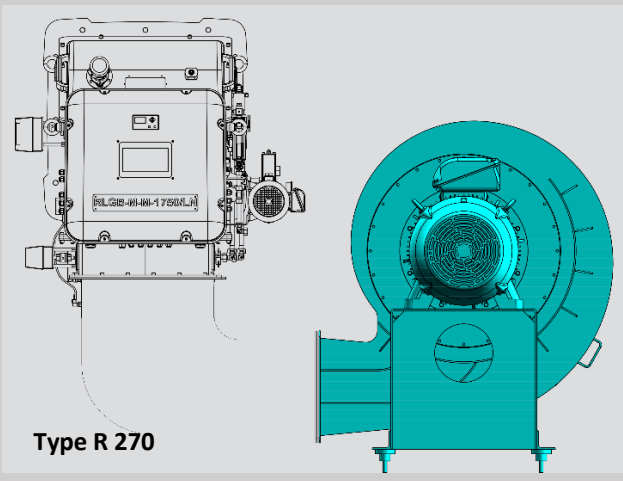
Type L 360



Type R 360



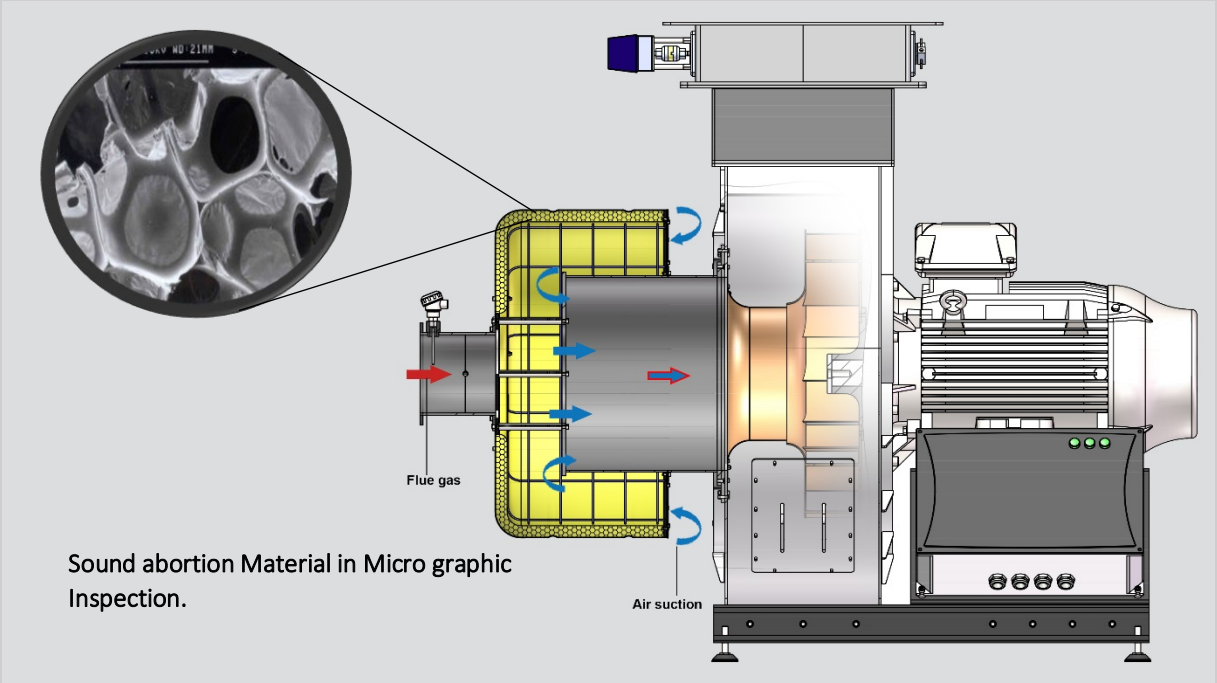
Type L 270



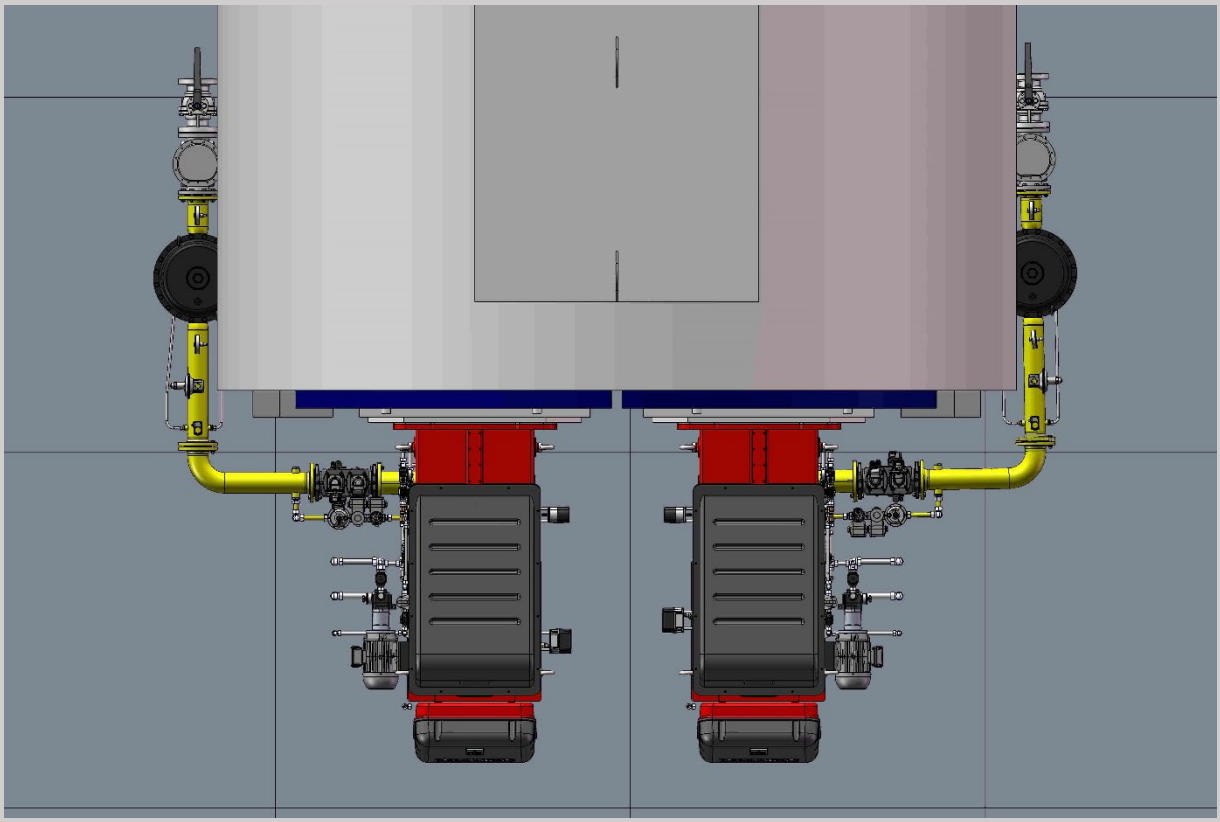
Type R 270

Acoustic absorption refers to the process by which a material, structure, or object takes in sound energy when sound waves are encountered, as opposed to reflecting the energy. Part of the absorbed energy is transformed into heat and part is transmitted through the absorbing body. The energy transformed into heat is said to have been 'lost'.

When sound from a loudspeaker collides with the walls, the sound's energy is reflected, part is transmitted, and part is absorbed into the walls. Just as the acoustic energy was transmitted through the air as pressure differentials (or deformations), the acoustic energy travels through the material which makes up the wall in the same manner. Deformation causes mechanical losses via conversion of part of the sound energy into heat, resulting in acoustic attenuation, mostly due to the wall's viscosity. Similar attenuation mechanisms apply for the air and any other medium through which sound travels.



Sound abortion Material in Micro graphic Inspection.



Thanks to the air/steam atomizing technology as well as the well-known pressure base spill back oil atomizers, we are delighted to gratefully guarantee the best performance of our productions in order to meet our customer demands.

Reliable flame monitoring

Flame monitoring plays a crucial role when it comes to reliability and safety.

Determination of the best method of flame monitoring takes into account not only the burner and the fuel to be combusted, but also how the system operates and the conditions inside the combustion chamber.

Heat generators with one flame per combustion chamber are easier to monitor than those with multiple flames. In the latter case, it also depends whether the flames are firing into the combustion chamber from the same or opposing directions.

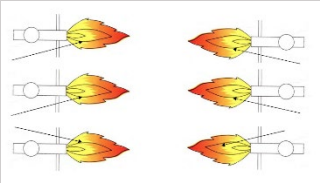
Biomass plant and waste incinerators need a flame monitoring system that is not affected by extraneous flames.

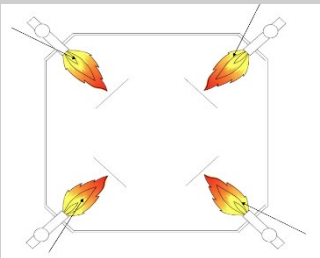
DB series are for plant with multiple burners firing from different directions into a single combustion chamber, and for process plant with various flame sources. The flame scanners monitor each flame separately via up to ten load-dependent switching thresholds for each fuel.

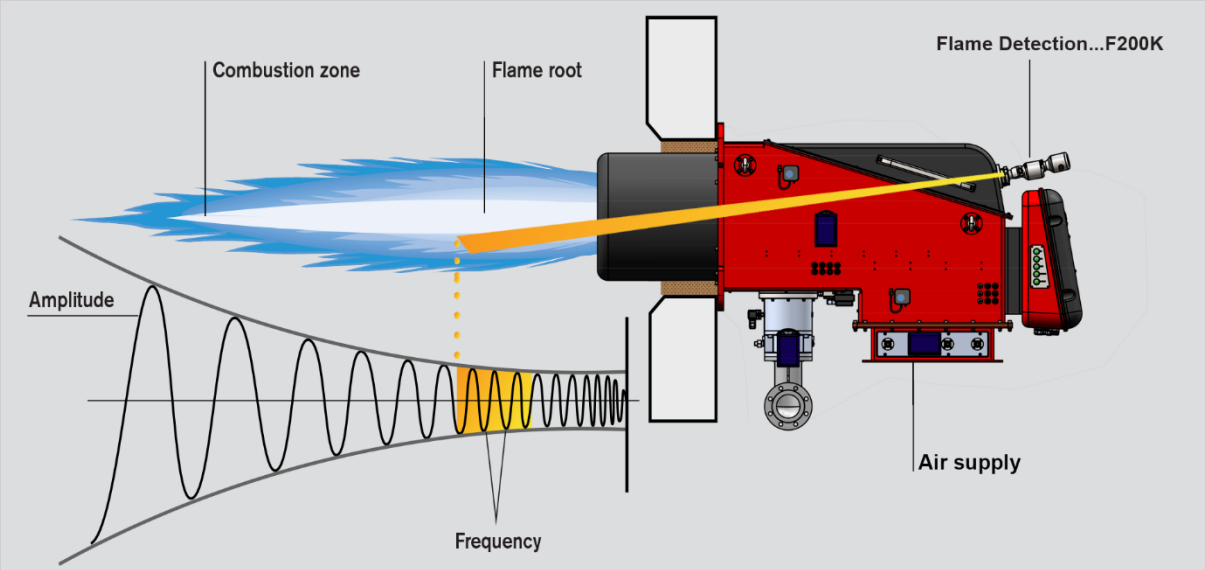
Lamtec - F200K

The compact flame scanner is composed of a cylindrical casing comprising an axial light incidence aperture, a processing status indicator at the rear of the unit and operational controls which can be accessed by removing the cover.

The device is connected through an integrated standard plug and using a connection cable required for this with coupler.







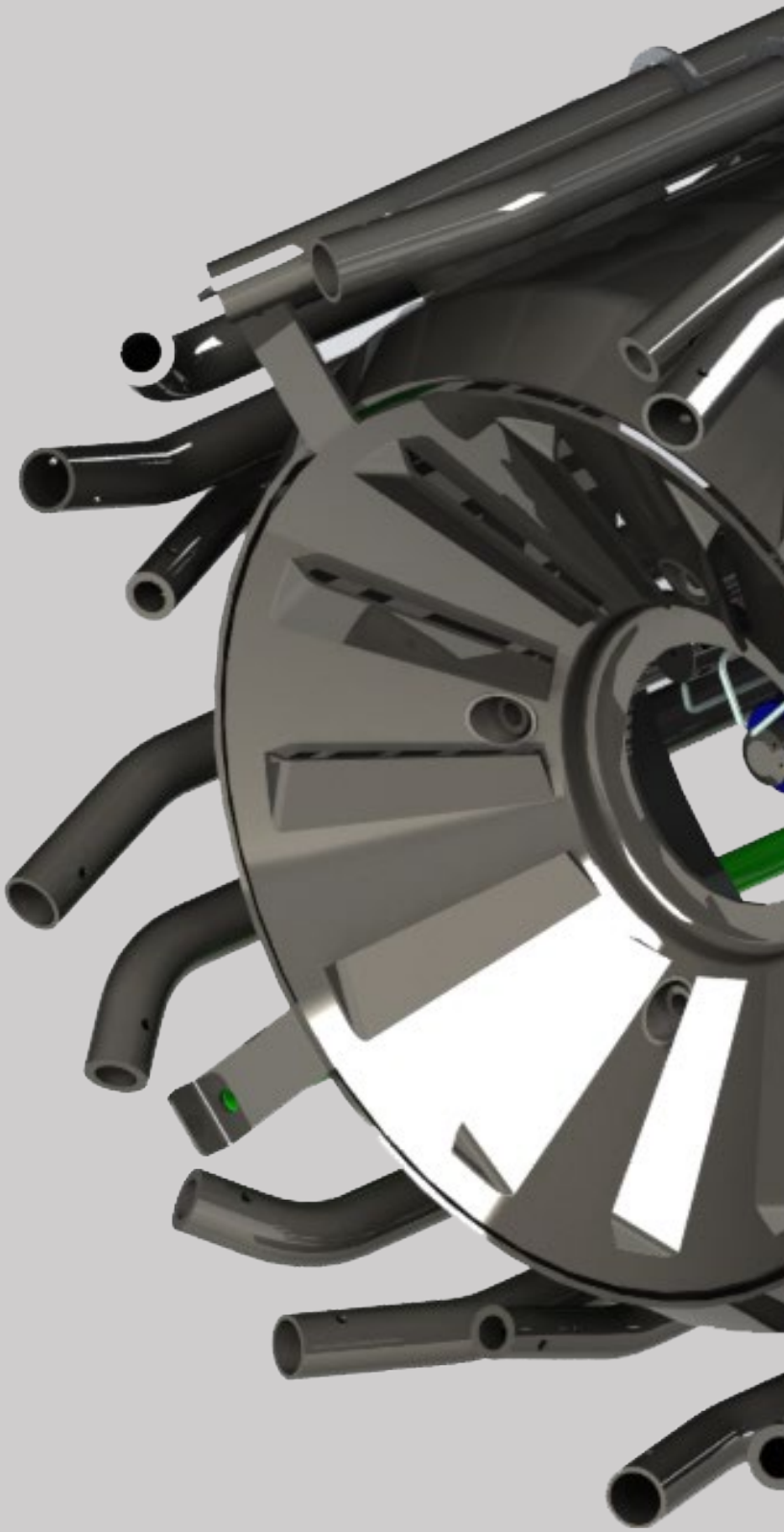
A look to the future:

With <u>Low-NOx burners</u>

NOx gases play an important role in the formation of smog, producing the brown haze often observed over cities, particularly during the summer. When exposed to the UV rays in sunlight, NOx molecules break apart and form ozone (O_3). The problem is made worse by the presence in the atmosphere of volatile organic compounds (VOC), which also interact with NOx to form dangerous molecules. Ozone at the ground level is a serious pollutant, unlike the protective ozone layer much higher up in the stratosphere.

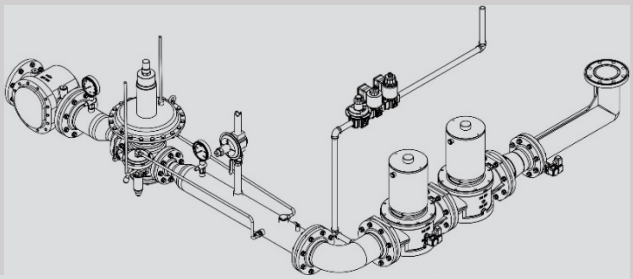
Nitrogen oxides form when oxygen and nitrogen from the air interact during a high-temperature combustion event. Heating industry and industrial burners, in particular, produce large amounts of nitrogen oxides.

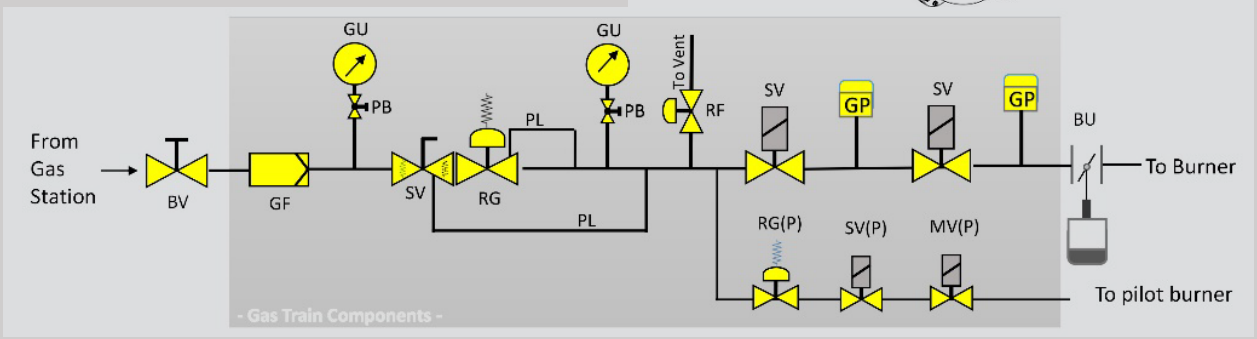
The idea of Low NOx burners is control fuel and air mixing at each burner in order to create larger and more branched flames. Peak flame temperature is thereby reduced, and results in less NOx formation. The improved flame structure also reduces the amount of oxygen available in the hottest part of the flame thus improving burner efficiency.



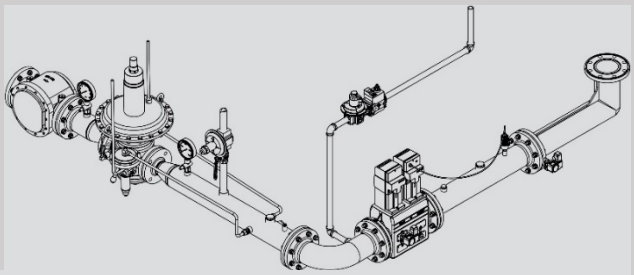
Gas train selection

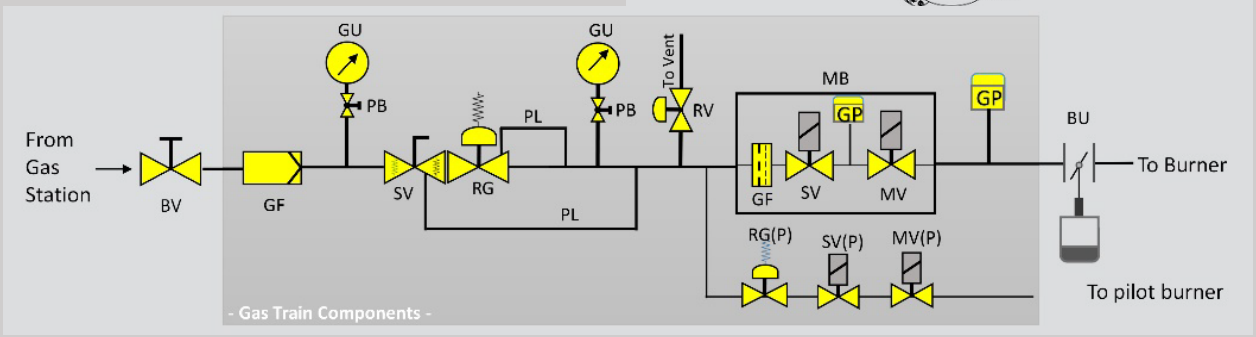
High-pressure gas supply, standard version
Used when:
Input pressure is > 2 bar
The total pressure loss in gas valves, Butterfly gate valve and combustion chamber resistance does not exceeded 200 mbar.



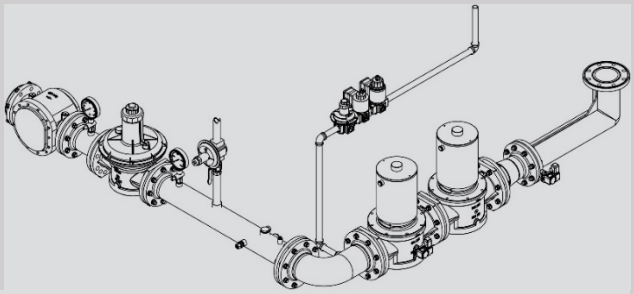


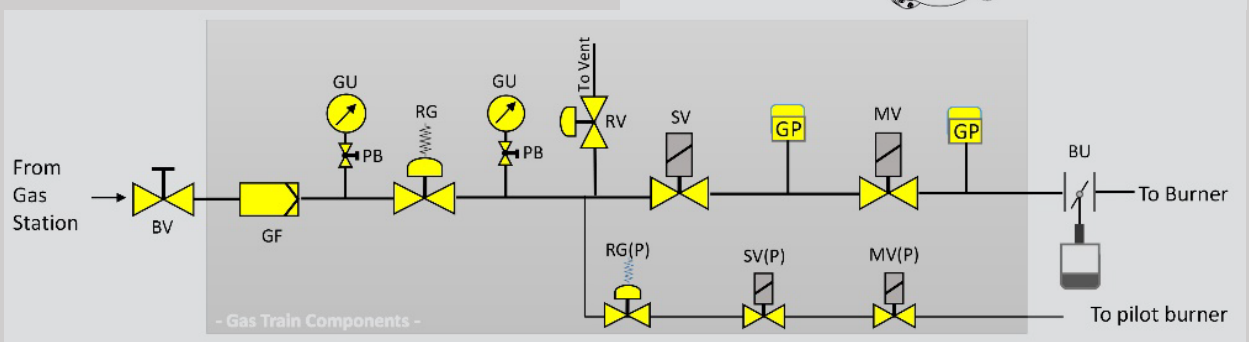
High-pressure gas supply, Multi bloc version
Used when:
Input pressure is > 2 bar
The total pressure loss in gas valves, Butterfly gate valve and combustion chamber resistance does not exceeded 350 mbar.



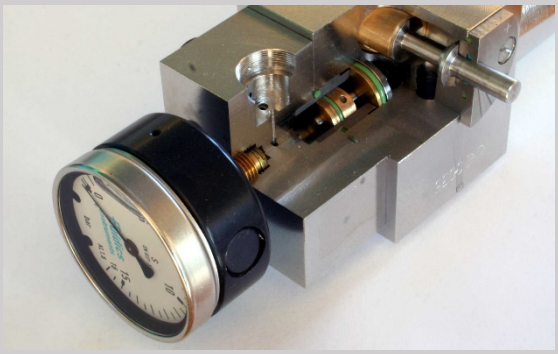


Low-pressure gas supply
Input pressure is < 360 bar
The total pressure loss in gas valves, Butterfly gate valve and combustion chamber resistance does not exceeded 200 mbar.





Pressure based spill back lances/atomizers:



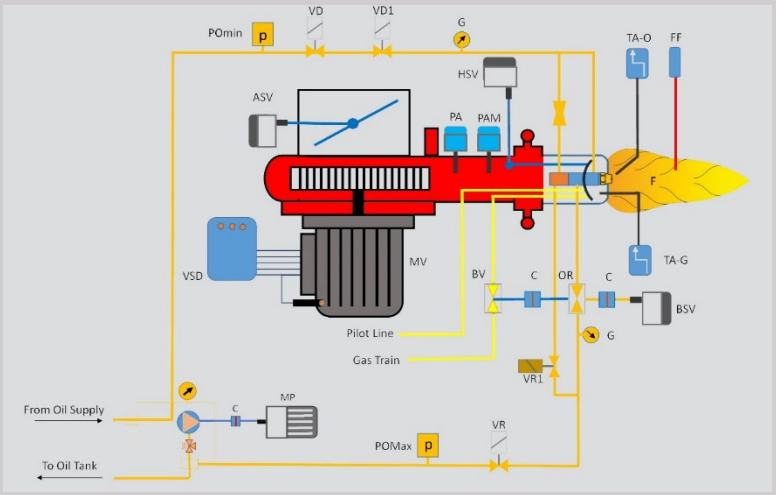
The burner-lance is especially suitable for use in or on an oil burner and is designed to operate spill back atomizers with integrated shut-off needle. The strong spring on the actuating rod pushes the needle in closed position. This ensures a reliable shut-off under all circumstances.

Fuel, branched off from the supply line actuates the piston for opening, either controlled by two external solenoid valves or by one 3/2 solenoid valve. The piston has a fixed travel. While opening, the needle inside the atomizer is retracted in the correct position by means of a spring at the back of the atomizer against a fixed stop on the needle itself.

During the pre-purge period of the burner, the needle is keeping the orifice closed and the fuel circulates through the lance at pre-set supply and return pressure. On energizing both solenoid valves and the 3/2 solenoid valve, even after long idle intervals, there is immediate atomization guaranteeing perfect ignition.

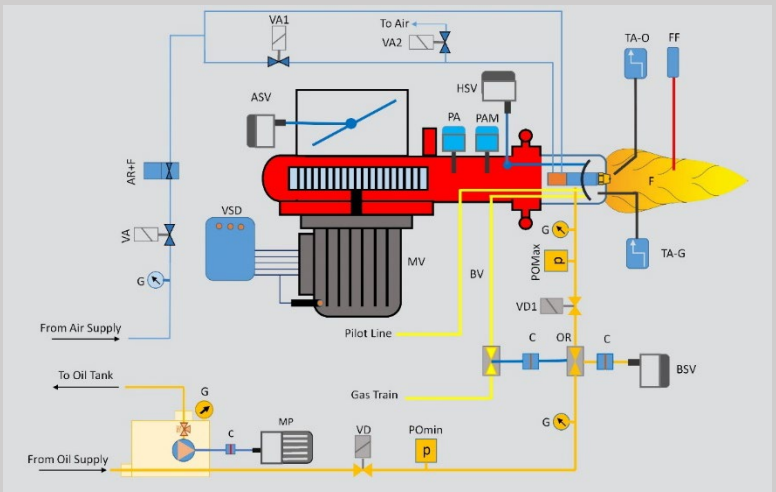
The burner-lance is suitable for supply pressures from 20 up to 40 bar and fuel temperatures up to 140°C.

Air/Steam lances/atomizers



The burner-lance of with shut-off needle is especially suitable for use in or on an oil burner and is designed to operate 32-Y atomizers with compressed air or steam.

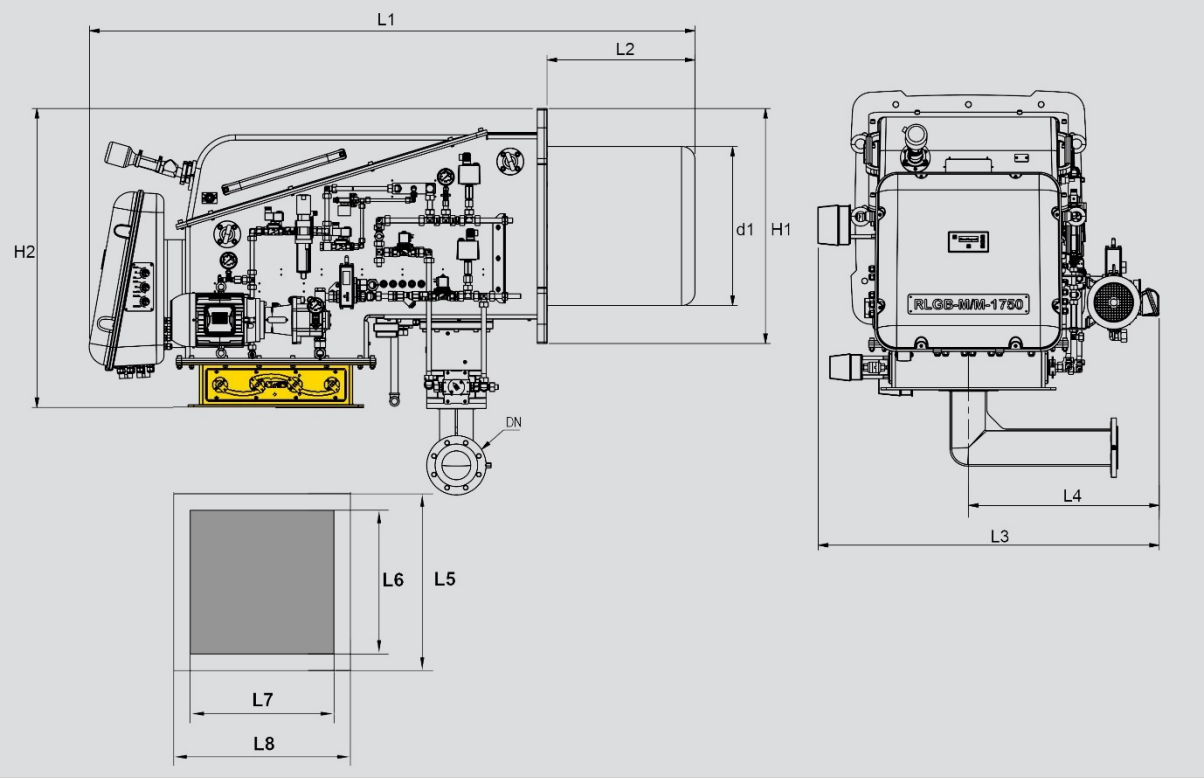
The strong spring on the actuating rod pushes the needle in closed position. Compressed air, controlled by an external 3/2 solenoid valve, actuates the piston for opening. The piston has a fixed travel, pulling the needle in the correct position when it opens.



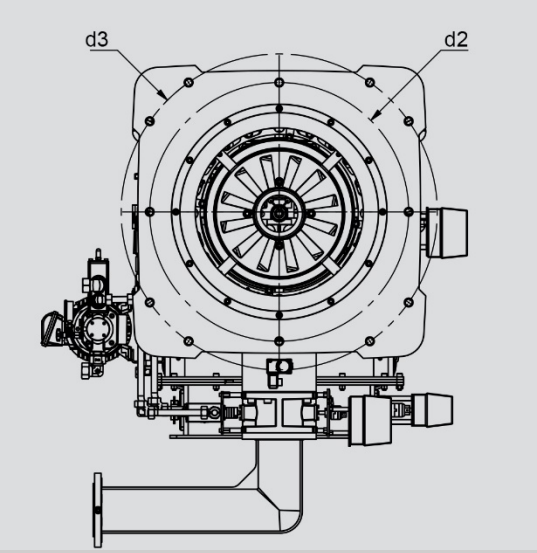
During the pre-purge period of the burner, the needle is keeping the central orifice in the reverse disc closed. On energizing the 3/2 solenoid valve, even after long idle intervals, there is immediate atomization guaranteeing perfect ignition.

The burner-lance is suitable for supply pressures up to 16 bar and fuel temperatures up to 140°C.

APROX Dimensions:



Model	DN	L1	L2	L3	L4	L5	L6	L7	L8	H1	H2	d 1
RLGB-M/M-705	100	1828	431	1034	402	630	500	418	548	670	1108	480
RLGB-M/M-805	100	1828	431	1034	402	630	500	418	548	670	1108	480
RLGB-M/M-950	100	1828	431	1034	402	630	500	418	548	670	1108	480
RLGB-M/M-1050	100	1828	431	1034	402	630	500	418	548	670	1108	480
RLGB-M/M-1550	100	2247	550	1241	685	650	568	568	650	868	1108	590
RLGB-M/M-1750	100	2247	550	1241	685	650	568	568	650	868	1108	590
RLGB-M/M-2550	100	2247	550	1241	685	670	588	568	670	868	1108	618
RLGB-M/M-3250	100	2247	550	1241	685	670	588	568	670	868	1108	618



Model	d 1	d 2	d 3
RLGB-M/M-705	480	735	735
RLGB-M/M-805	480	735	735
RLGB-M/M-950	480	735	735
RLGB-M/M-1050	480	735	735
RLGB-M/M-1550	590	770	875
RLGB-M/M-1750	590	770	875
RLGB-M/M-2550	600	770	875
RLGB-M/M-3250	618	770	875

Note:

Since to the project based scenario of BD-Series burners, we strongly recommend to contact us for exact dimensions for a superior plant arrangements.

Last but not the least!
Raadman burners cover a range of 100 up to 40,000 kW generally. However, BD-series, as a dual-bloc concept, covers a range of 700-32000 kW in 9 versions/capacities with 1:8 to 1:10 turndown ratio.

They can be used wherever heat is needed – in heating residences or hospitals, schools or offices, in industry or trade, on board ships and for mobile plant. They are suitable for all commonly available gas and oil types and are notable for their reliability, longevity and great economy. Nearly all burner types over the entire performance range are available in a Low NO_x version, with particularly low emission levels.

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