



RGB-M-1350



TECHNICAL PROPOSAL

Prepared by Raadman Group
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- SMILE INTO THE FUTURE -

www.raadmanburner.com

A short introduction of PACKMAN modular gas burners

RGB-M Series or RAADMAN mono-block modular gas burners, covering a firing range from 190 to 25000 kW, are designed for a wide range of domestic and industrial applications. All RAADMAN modular burners are equipped with AUTOFLAME, or SIEMENS electronic control system with capability of full air/gas ratio control throughout entire burner operating range. These burners have been tested and evaluated based on Iran national standard ISIRI-7595 (BS-EN 676). According to performed experiments, the values of CO even in low excess air operation is lower than 30 mg/kWh. The precise design of combustion head results a full gas-air mixture that guarantees high efficiency levels in all various applications. Burner superior design accompanied by high quality electronic devices have also resulted a further improvement in boiler's performance in order to decrease fuel cost and emissions.

RGB-M-1350 (1350-13500 kW)

RGB-M-1350 is an electronic gas fuel burner with 1:10 turn down ratio, which is appropriate of different industrial applications. The values of CO and NO_x during burner operation are lower than 30 and 120 mg/kWh, respectively. Therefore, the burner's NO_x class of II is reported and approved. It also has the optional ability of running with FGR, in order to get the III class of NO_x, lower than 80 mg/kWh. Compact design, silent operation due to injected absorbing material, backward fan wheel and independent actuators are the most considerable advantages for this burner.



Figure 1 – RGB-M-1350 with Autoflame controller

Burner Certificate

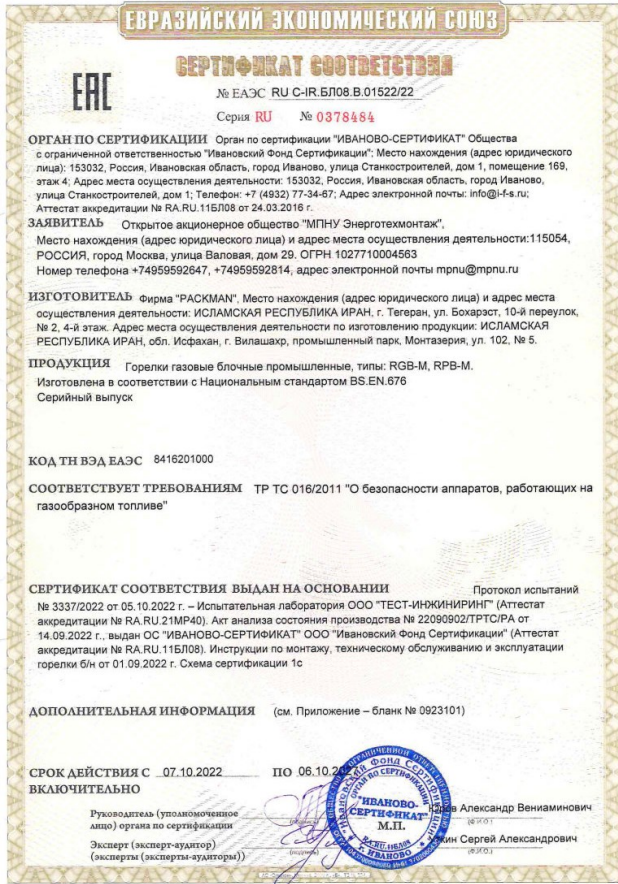


Figure 2 -Burner certification based on the Eurasian Conformity (EAC), Equal to the BS-EN 676 international standard.



Figure 3 -Burner certification based on the Iran national standard ISIRI-7595, Equal to the BS-EN 676 international standard.

General Dimension

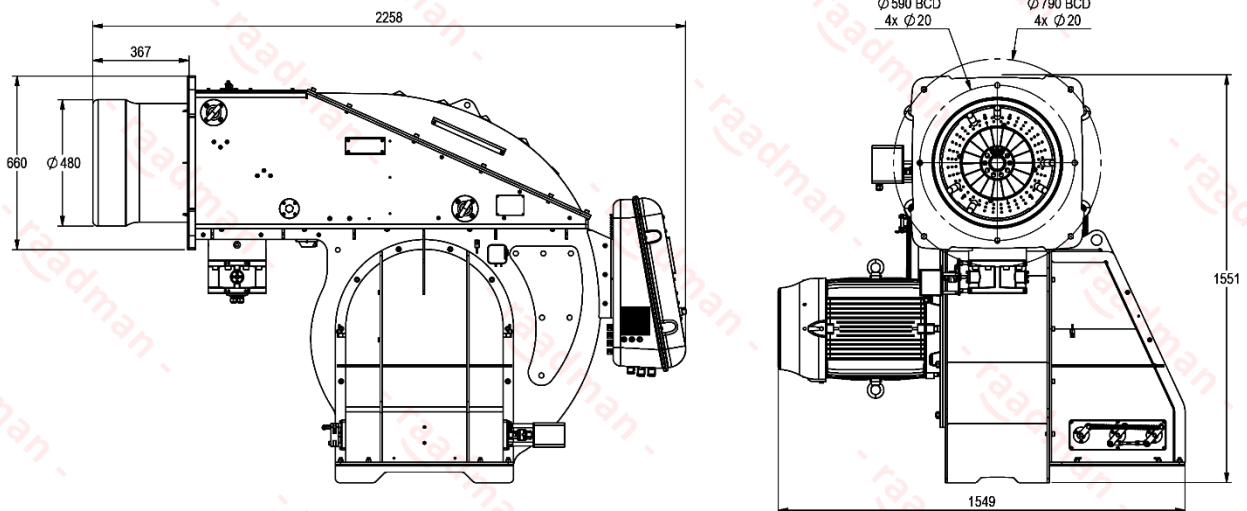


Figure 4 - Burner Dimensions

Notice: Any illegal copy or any kind of partial reversed engineering could be followed by the owner; and this company has the authority to track it by LAW.

Firing Rate

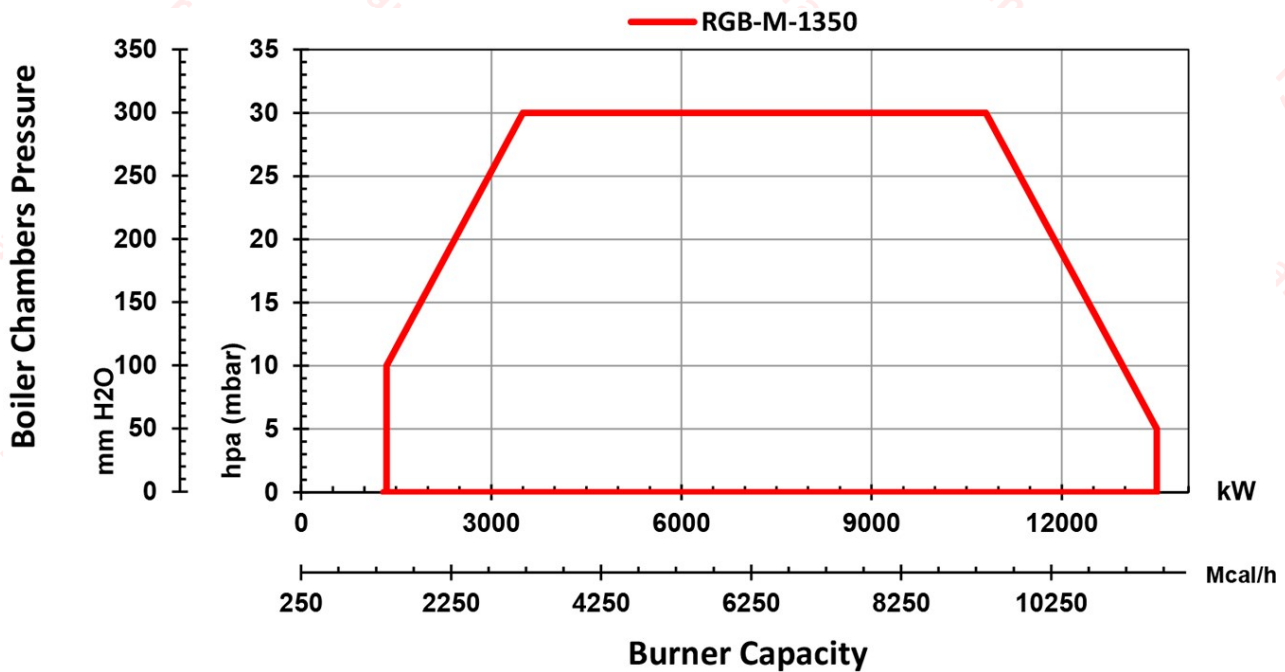



Figure 5 - Burner Firing Diagram



 The firing rate diagram has been obtained considering ambient temperature of 20°C and atmospheric pressure of 1013 mbar (Sea level condition) according to the BS-EN 267 & BS-EN 676.

 Turn-down ratio higher than (1:8, 1:9, 1:10, etc.) are accessible for the burner with the head actuator. Otherwise, without a head actuator, the max turn-down ratio is 1:6.

RGB-M-1350 Technical and Functional Features

- Highly efficient gas burner for industrial applications.
- Light weight and optimized geometry.
- Compatible with all types of combustion chambers according to EN303 standard.
- Simple Installation, adjustment and inexpensive maintenance.
- Modular operation.
- Ability to work based on Air-Fuel control curve.
- Large housing cover for optimal accessibility to the internal components.
- Rail system for ergonomic servicing of the mixing assembly.
- Engineered for maximize efficiency and fuel cost savings.
- Designed in accordance with ISIRI-7595 and EAC (BS-EN 676)
- Suitable for single/double hot water/steam boilers plus high capacity multi burner water tube boilers.
- Equipped with high quality and reliable electronic devices.

Table1 - RGB-M-1350 Combustion Specification

Item	Description
Fuels	Natural Gas
Gas Capacity ¹	1350-13500 kW
Gas operation	Electrical Modular System
Gas Pollution	II class of NOx according to BS-EN 676
Certificates Certificates No.	ISIRI 7595, EAC 6374915975, 0378484
Other abilities	<div style="text-align: right;">   </div> <ul style="list-style-type: none"> - Low excess air operation. - Ability to run according to the Air/fuel ratio curve. - Ability of Communication with external systems via DTI. - Independent ignition point position for safe burner starts. - Adjustable pre-purge and post purge time. - Absence of joint clearance using linkage-less actuators avoiding mechanical hysteresis. - Easy commissioning using modular human interface. - Parameter's indication. - History of errors. - Mono-bloc configuration. - Including valve proving system. - Use of a third actuator for movement of mechanical head for better combustion especially in lower capacities. - High turn down ratio for avoiding any shut down in low required loads. - Economical price using central burner controllers (With improved technology and ease of use, combustion plant is becoming even more economical as: NO additional burner controller is required, less installation work with less errors, NO additional cost for valve proving, Taking less time for commissioning and service work) <p><u>Options**:</u></p> <ul style="list-style-type: none"> - Ability to install a variable speed drive for avoiding any impact in startup - Ability of running with O₂, CO, CO₂, NO and SO₂ sensors. - Ability of working with FGR for further reduction in the NOx level. - Ability of working with LPG with LPG kit.

1- Reference conditions: Ambient temperature 20°C - Gas temperature 15°C - Barometric pressure 1013 mbar - Altitude 0 m

2-Kindly note that the options are not included in the routine offers and they need to be ordered by the customers. Please contact us for further information or assistance.

Table 2 - Burner Equipment and Accessories

Power System with Soft Starter		
Item	Specification	Manufacturer ¹
Main motor	37 kW, 3 Phase, B35, 380-400 Volt, 50 Hz, 2900 rpm	ELECTROGEN
Burner Management System		
Main controller	Mini Mk8 M.M. Module 4 Channel with Burner Management Control, 7" full color touch screen	AUTOFLAME
Air actuator	Large Servo Motor, 230V 50/60Hz, Metal Housing 25Nm, 18ft lbs - Supplied with 2off PG11 Glands	AUTOFLAME
Head actuator	Large Servo Motor, 230V 50/60Hz, Metal Housing 25Nm, 18ft lbs - Supplied with 2off PG11 Glands	AUTOFLAME
Fuel actuator	Small Servo Motor, 230V 50Hz (Fuel actuator) 4Nm, 3ft lbs - Supplied with 2off PG11 Metal Glands	AUTOFLAME
FGR actuator	Small Servo Motor, 230V 50Hz (Fuel actuator) 4Nm, 3ft lbs - Supplied with 2off PG11 Metal Glands	AUTOFLAME
Flame scanner	MM80004/HS High Sensitivity, End/Side View UV Scanner	AUTOFLAME
Ignition System		
Item	Specification	Manufacturer ¹
Transformer	FIDA Ignition Transformer 1 Wire	FIDA
Gas pilot	Appropriate for 1350 series	PACKMAN CO
Other Components		
Item	Specification	Manufacturer ¹
Min Air pressure switch	LGW 50 A2, 5-50 mbar	DUNGS
Max Air pressure switch	LGW 150 A2, 5-150 mbar	DUNGS
Other Components (Optional features ² , replacement of maximum air pressure switch and leak test pressure switch)		
Item	Specification	Manufacturer ¹
Gas pressure sensor	MM80008 Pressure Range: ± 344 mbar Zero Range: ± 6.88	AUTOFLAME
Air pressure sensor	MM80013 Pressure Range: ± 137 mbar Zero Range: ± 2.74	AUTOFLAME

1- Though these brands are common in this type of burner, they would may change based on available components in the market or according to the policy of Packman Co.

2-These types of sensors are used for monitoring and drawing the gas pressure graph with the help of the Autoflame Mini MK8 controller in gas trains and are installed between the safety and main valves, and regarding the controller, it is quite recommended to use gas pressure sensor instead of leak test pressure switch and Max gas pressure switch. Kindly note that gas pressure sensor set is an optional item and can be easily ordered while placing the order of the burner.

Table 3 - Recommended Gas Train

Standard Gas Train: Separated items, DN 100/80, Lower than 500 mbar			
Item	QTY	Specification	Manufacturer ¹
Multi-block Solenoid Valve	1	MBE-VB-80, Working Pressure, 700 mbar Valve Drive VD-V-AC, Valve Drive VD-R-AC DN80	DUNGS
Pressure transmitter	1	PS-50/200	DUNGS
Gas Filter	1	GF 60100/4 Max operating pressure = 4 bar, DN 100	DUNGS
Vent Valve ²	1	Solenoid valve, MVD 207/5 Single stage gas valve, Fast opening fast closing, Max operating pressure=360 mbar, Rp $\frac{3}{4}$	DUNGS
Safety pilot valve	1	Solenoid valve, MVD 207/5 Single stage gas valve, Fast opening fast closing, Max operating pressure=360 mbar, Rp $\frac{3}{4}$	DUNGS
Main pilot valve	1	Solenoid valve, MVDLE 207/5 Single stage gas valve, Slow opening fast closing, Max operating pressure = 360 mbar, Rp $\frac{3}{4}$	DUNGS
FRS 507	1	Pressure regulator with spring P max=500 mbar, Rp $\frac{3}{4}$	DUNGS
Gas pressure switch	2	GW 500 A6 Range: 100-500 mbar - with plug	DUNGS
Leak Test Gas pressure switch	1	GW 50 A6 Range: 5-150 mbar - with plug	DUNGS
Pressure indicator	1	Range: 0-600 mbar, Rp $\frac{1}{2}$	
Pressure indicator	1	Range: 0-250 mbar, Rp $\frac{1}{2}$	
Collector 1	1	DN 100 - DN 80	
Collector 2	1	DN 80 - DN 100	

1- Though these brands are common in this type of burner, they would may change based on available components in the market (such as MADAS, SIEMENS, etc.) or according to the policy of Packman Co.

2- Optional



Burner Model: RGB-M-1350 --- Output : 1350 – 13500 kW
 Gas consumption: 1350 m³/h -- General Pipe size : DN 100 --- Pilot pipe size : Rp 3/4

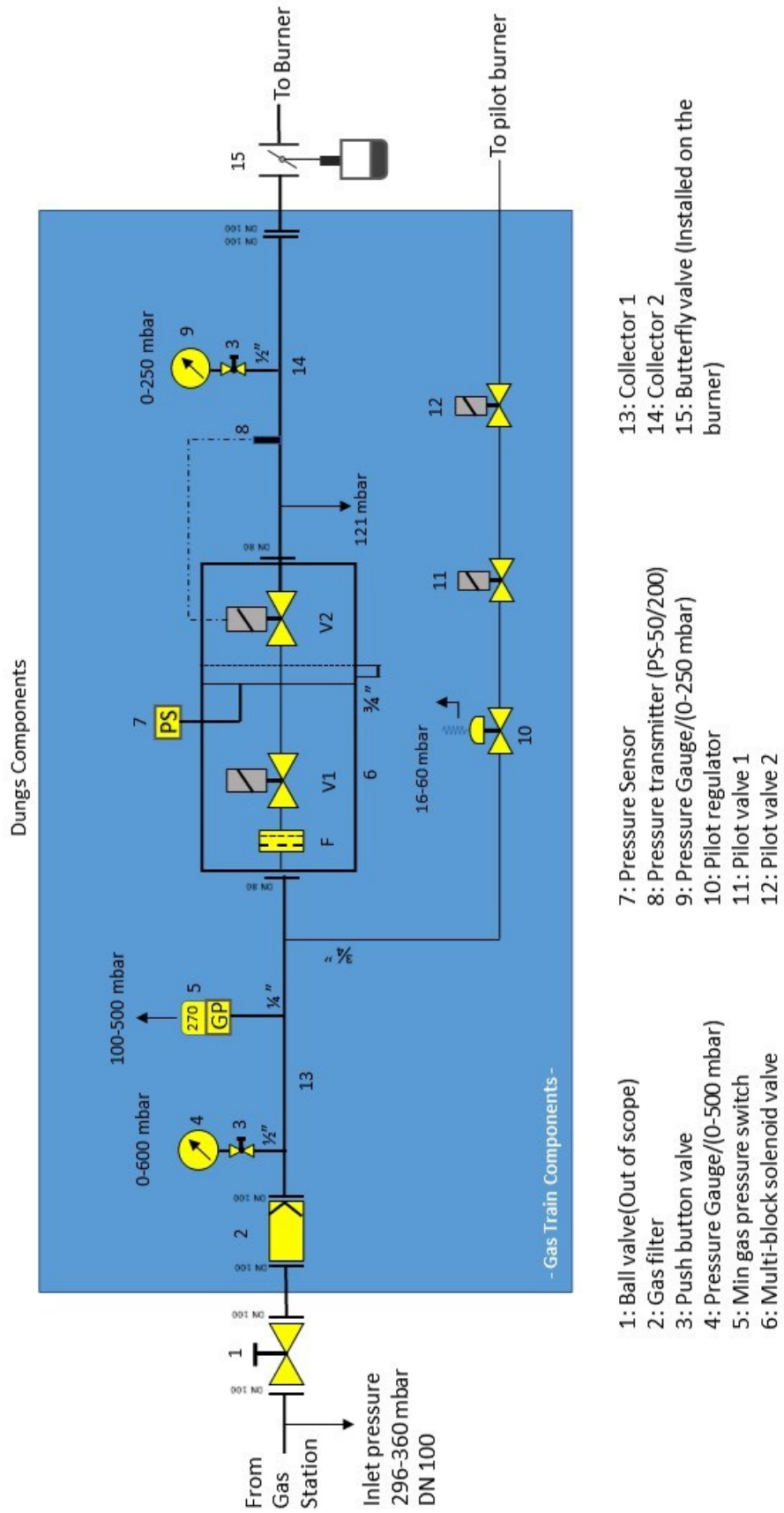
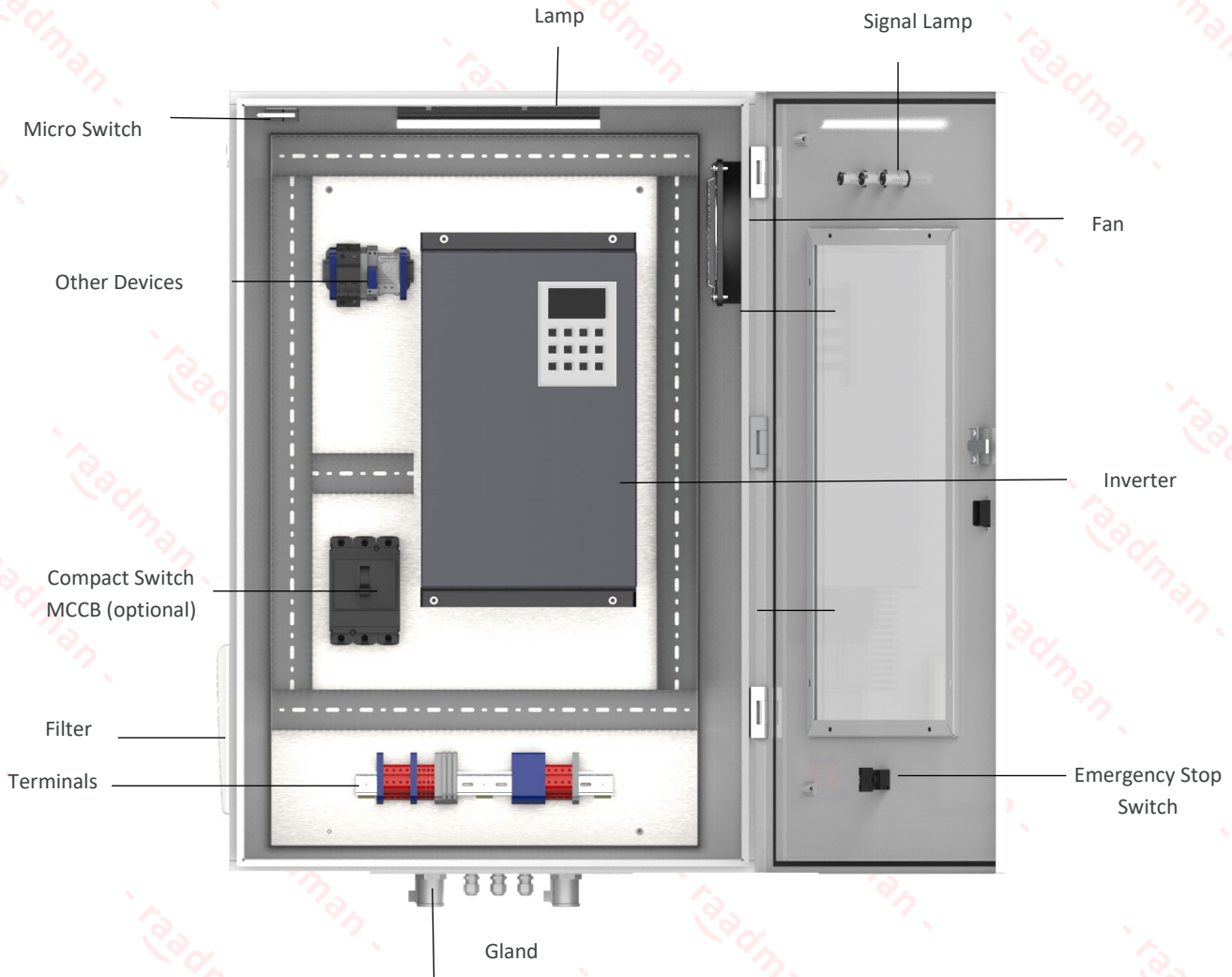


Figure 6 - Gas train diagram, DN100/80, up to 500mbar

RMS

raadman factory produces burners with a firing range of 100 kW to 60000 kW. In burners with a ventilation motor capacity of 30kW and more, the power and control circuits need to be installed separately due to the destructive effects and noise of the power circuit's high voltage on control devices. For this reason, the raadman motor starter (RMS) is provided.

The panel related to air supply system motor starter is provided in two models: cabinet and standing.



Power System with Inverter		
Item	Specification	Manufacturer
Electrical Panel Box	RMS-37-VSD-II	raadman
Variable speed drive	VSD for 37 kW	Vortex or another brand

We do not recommend start-delta starters for powers above 45 kW. In these cases, VSD is more recommended.

We recommend to use VSD in order to control the noise level of the burners as well as enhancing the entire capabilities. All customers are welcome to handle the power system by their selves or place an order of RMS (Raadman Motor stater) with us.

Test

At Raadman factory, we are committed to delivering industrial burners of the highest quality. Manufacturer's comprehensive testing process consists of the following stages, each designed to ensure reliability and performance:

1. **Material Inspection and Quality Control:** Before assembly, all materials are subjected to thorough inspections and quality control tests. A detailed checklist is used by Manufacturer's technicians to ensure that all specifications are met.
2. **Cold Testing:** After assembly, we conduct a cold test to verify the functionality of all components and balance the fan for optimal performance. This stage also includes a checklist of tasks that is carefully reviewed and ticked off by Manufacturer's technicians.
3. **Warm Testing:** The final stage is the warm test, where the burner is operated using the specific fuels requested by the Client. This ensures the burner performs reliably under real-world conditions. Upon successful completion of the warm test, the burner is issued a **Quality Control Badge** and an accompanying **Burner Final Assessment Certificate** as proof of its readiness and adherence to quality standards.

By following this structured and meticulous approach, we ensure that every burner we produce meets or exceeds Client expectations for safety, efficiency, and reliability.

Spare Parts

Will be clarified in the future in another financial document and based on the client preferences.

Packing

To ensure the safe and secure delivery of Manufacturer's industrial burners, we follow a meticulous packing procedure tailored for transportation in a 40-foot truck. The process includes:

1. **Plastic Covers:** Each burner is carefully wrapped with durable plastic covers to protect it from dust, moisture, and minor abrasions during transit.
2. **Wood Packaging:** The wrapped burners are then secured in sturdy wooden packages made from high-quality Russian wood. This provides robust protection against impact and ensures stability during transportation.

This packing method guarantees that Manufacturer's products arrive at their destination in perfect condition, ready for installation and operation.



Figure 7 – Data transfer interface panel – for all burners

Guarantees

1- Process guarantees:

The data shown in the present offer may vary, in case of order, owing to the detailed execution of the process, thermal and mechanical design.

It will be Manufacturer's right, therefore, to make all necessary modifications to obtain from the offered equipment the guaranteed performances.

Should we have omitted any materials necessary for the construction of the above units, within the limits of the supply, mentioned materials will be supplied by us free of charge.

Other eventual materials to be provided owing to changes of Client's specifications will be charged Client.

We guarantee the following:

- Max burner rated output
- Pressure drops across burner for combustion air and fuel gas
- Flame length
- Emissions
- Turn down
- Fuel flow rate of all fuels at peak load.
- Sound emissions
- Performance test

2- Mechanical Guarantees:

We guarantee that the materials are new and of first quality, free from defect that may jeopardize or decrease their characteristics for use.

The work will be carried out according to good engineering and construction criteria, for this reason we guarantee that Manufacturer's equipment is free from any faults resulting from defective manufacture material for a period of 24 months from the start-up date or at the latest 30 months from delivery date.

The materials good maintenance after delivery is under the Client responsibility and it is a main condition for the guaranteed validity.

The items or devices that will be recognized defective shall be repaired or replaced under same delivery conditions foreseen in the Purchase Order. All indirect or consequential damage and cost shall be excluded from Manufacturer's guarantee.

The above-mentioned repairs or replacements cannot, in any way, postpone the guarantee period terms. Manufacturer's guarantee provide that the material has a good treatment during loading, transportation, unloading, storage and erection at site.

Manufacturer shall not be responsible for defects due to normal wear, faulty or careless operation, excessive use and/or extraordinary atmospheric and natural influences.

3- Electrical Guarantees:

We guarantee that all electrical components and systems supplied with this equipment are free from defects in materials and workmanship for a period of 12 months from the date of initial startup or at the latest 18 months from the date of delivery, whichever occurs first.

This guarantee covers:

- Proper functioning of all electrical control panels, instrumentation, and wiring.
- Absence of electrical faults that may cause equipment malfunction or safety hazards.

This guarantee does not cover:

- Damage caused by improper installation, operation, or maintenance.
- Damage resulting from misuse, abuse, or neglect.
- Damage caused by acts of God, such as lightning strikes or floods.
- Damage resulting from the use of unauthorized parts or modifications.
- Normal wear and tear of components.
- Consumable items such as fuses, lamps, and batteries.

Remedies:

In the event of a valid electrical guarantee claim, we will, at Manufacturer's discretion, repair or replace the defective component(s).

Disclaimer:

The performance, mechanical, and electrical guarantees outlined in this proposal are subject to the conditions specified herein. The Manufacturer reserves the right to modify the design, materials, or processes as necessary to achieve the guaranteed performance. These guarantees exclude indirect, consequential, or incidental damages, as well as defects caused by improper installation, operation, maintenance, misuse, or extraordinary natural events. The Client is responsible for the proper handling, storage, and maintenance of the equipment. Guarantees are valid only for the specified periods and are void if the equipment is not used in accordance with the terms outlined in this proposal.

**** THE END OF TECHNICAL PROPOSAL ****



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