BURNERS

GAS BURNER SERIES

- ☐ **GNG 90/3**
- ☐ **GNG 90/4**
- ☐ **GNG 90/5**

Content

Since the company is constantly improving products, the right of changing the technical data and equipment accessories is reserved for the company

Product Introduction

Small Factories Industrial Burners

- Gas burners series
- Applicable to: Industrial use with steam or hot water, electroplate ceramic baking heat, light industry, metallurgical manufacturing cakes and pastries, dairy and hot oil boilers
- High Efficiency
- Heat Supply: 85,000 – 550,000 Kcal/h
- Manufactured of high quality parts
- Easy installation and commissioning
- High safety by providing advanced control system
- Low noise
- Wide range of accessories
- Minimum weight and dimensions
- Fully tested after manufacturing

Model	Capacity
GNG 90/3	85,000 - 340,000 kcal/h
GNG 90/4	100,000 - 450,000 kcal/h
GNG 90/5	130,000 - 550,000 kcal/h

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Installation, Commissioning and Operation

Please Note to the following steps in the product setup

All numerical settings, inspection items, and time intervals are typical minimum guidelines. The owner/user is responsible for establishing, documenting, and enforcing the actual inspection, testing, and maintenance program based on:

- Manufacturer instructions for the specific burner/boiler
- Applicable codes and standards (e.g., gas code, boiler code, process heating safety codes)
- Site-specific conditions (gas quality, dust/soot, operating hours, ambient environment)

A. Pre-Installation Requirements

1. Prior to burner installation, ensure that the boiler furnace, heat exchanger surfaces, combustion chamber, and the entire chimney/flue gas path are completely clean and unobstructed. Remove soot, deposits, or condensate residues by mechanical and/or chemical cleaning as required.

2. Where required by the flue design, install a suitable windproof (anti-downdraft) chimney terminal to minimize reverse draft, flame instability, and false flame detection.

3. Verify that the boiler room is clean, dry, well ventilated, and free from dust, oil mist, debris, or lightweight objects that could be drawn into the combustion air fan or air intake.

4. Provide permanent combustion air openings sized in accordance with burner capacity and applicable standards or local building codes. Insufficient combustion air may result in incomplete combustion, CO formation, flame instability, or nuisance lockouts.

5. Ensure that no flammable or combustible materials are stored near the burner or boiler. Install a suitable, certified fire extinguisher in the boiler room and keep it readily accessible.

B. Mechanical Installation

6. Mount the burner to the boiler using the burner head flange provided by the manufacturer.
7. Install a heat-resistant, non-flammable gasket between the burner flange and boiler mounting plate to ensure gas-tight sealing, thermal insulation, and prevention of flue gas leakage.
8. Install the burner with the mounting axis in the orientation specified by the manufacturer (typically horizontal). Improper alignment may adversely affect flame geometry, ignition reliability, and burner head service life.
9. Maintain adequate clearance around the burner for visual inspection, adjustment, tuning, and safe maintenance and component replacement.

C. Gas Supply Line

10. Construct the gas supply piping from approved materials compatible with the burner gas train and operating pressure.
11. Flexible connections, if used, shall:
    a. Be certified for gas service
    b. Not exceed 1.5 m in length
    c. Be installed without torsion or mechanical stress
12. Install a suitable gas filter upstream of the burner gas train (e.g., upstream of solenoid valves and regulators) to protect valves, regulators, and safety components from contamination.

13. Install a manual gas shut-off valve upstream of the burner gas train at an accessible location for emergency isolation and safe maintenance.

14. After completion of gas piping and any subsequent work on the gas system, perform a leak test using soapsuds or an approved gas leak detection solution. Eliminate any leakage before commissioning. Use of open flame for leak testing is strictly prohibited.

D. Electrical Installation and Safety

15. Connect electrical power only after all mechanical and gas installations have been completed, inspected, and leak tested.

16. Protect the burner electrical supply circuit with properly rated fuses or circuit breakers to prevent damage from overloads or short circuits.

17. Incorporate a thermostat, temperature or pressure controller, and required safety limits in the burner control circuit to ensure automatic and safe operation. Bypassing or short-circuiting any safety device is prohibited.

18. Provide proper grounding (earthing) of the burner, gas train (if required), and control panel to ensure personnel safety and reliable flame detection.

E. Commissioning and Adjustment

19. Adjust the burner firing rate in accordance with:
    a. Boiler combustion chamber volume and geometry
    b. Boiler rated thermal capacity
    c. Burner nominal output range and gas train capacity

20. After ignition, inspect the flame through the sight (inspection) port. A correct flame should be:
    a. Stable and well anchored

b. Uniform in shape
c. Free from pulsation, flashback, smoke, or pronounced yellow tips

21. Start and stop the burner several consecutive times to verify:
    a. Reliable ignition
    b. Proper flame detection
    c. Correct safety shutdown sequence

22. Proper combustion shall be essentially odorless and smokeless. Any abnormal noise, vibration, smell, or flame behavior indicates improper adjustment or air–fuel imbalance and must be corrected before continued operation.

23. For small to medium gas burners, a single slow-opening solenoid valve is often used; the slow opening characteristic ensures gradual gas admission, reducing ignition shock and improving flame stability when correctly adjusted.

24. Burners are typically factory calibrated for natural gas of a defined quality. Any change in gas family, calorific value, or supply pressure requires assessment and recalibration by qualified personnel using combustion analysis instruments.

25. Factory air damper and gas settings shall not be modified except by qualified personnel using flue gas analyzers to verify CO, O_2, and excess air levels, in accordance with manufacturer procedures.

26. Excess combustion air reduces thermal efficiency, may increase noise, and lowers flame temperature; insufficient air results in incomplete combustion and CO formation. The air–fuel ratio must always be adjusted to an optimal value confirmed by combustion measurements.

27. When two or more burners are supplied from a common gas header, equip each burner with an individual pressure regulating or balancing device to compensate for pressure losses and ensure stable operation and correct gas distribution.

F. General Safety and Operational Notes

28. Do not alter factory set or commissioned air/fuel settings unless the work is carried out by qualified personnel using appropriate combustion measuring instruments and following manufacturer tuning procedures.

29. A properly adjusted gas burner operates with a stable flame, no significant fuel odor, and no visible smoke under normal operating conditions.

30. Installation, setup, adjustment, and commissioning must be performed by qualified and authorized service personnel familiar with gas combustion systems and relevant standards.

31. Repeated burner lockouts, flame failure alarms, or nuisance trips indicate abnormal conditions. Repeated attempts to restart the burner without identifying and correcting the root cause are prohibited. The system must be inspected and repaired before being returned to service.

Maintenance

A. General Maintenance Principles

1. All inspection, testing, and maintenance of the gas burner and gas train shall be carried out by qualified and authorized personnel familiar with gas combustion systems and burner management systems.

2. The inspection and maintenance frequencies indicated below (daily, weekly, monthly, etc.) are typical minimum guidelines. The owner/user shall:
   a. Develop a written preventive maintenance program for each burner/boiler
   b. Adjust frequencies based on operating experience, regulatory requirements, and manufacturer recommendations

3. Before any maintenance work:
   a. Isolate electrical power to the burner and apply lockout/tagout where required
   b. Close manual gas shut-off valves
   c. Allow the burner and boiler to cool to a safe temperature

4. Use only original or manufacturer-approved spare parts. Unauthorized modifications or non-approved parts may compromise safety, performance, and certification.

B. Routine Operator Checks (Per Shift / Daily)

5. As part of routine operating rounds (e.g., each shift or at least daily), operators shall visually check:
   a. Burner startup and flame stability (no pulsation, lift-off, or flameout)
   b. Absence of abnormal noise, vibration, smoke, or persistent gas odor
   c. Burner control panel indications (normal operation, no alarms or lockouts)

6. Check the boiler room for:
   a. Gas odor or evidence of leaks
   b. Combustion air openings and ventilation paths free from obstruction
   c. Absence of combustible materials stored near the burner or boiler

C. Periodic Inspections (Weekly / As Per Site Program)

7. At intervals defined by the site maintenance program (typically at least weekly for continuously operated plants), inspect:
   a. Gas lines, valves, and connections for leaks, corrosion, mechanical damage, or overheating
   b. Electrical cables, terminals, and grounding points for tightness and signs of overheating
   c. Fan, air intake, and damper movement for full and smooth travel without sticking or excessive play

8. Observe flame signal level and stability (ionization current or other sensor) through the burner control according to the control manufacturer's instructions. Investigate any marginal or fluctuating readings.

D. Component Cleaning and Adjustments (Monthly / As Needed)

9. Flame sensor (ionization probe or other type):
   a. Inspect and clean the sensor and any viewing port at intervals appropriate to dust and contamination levels; at least monthly in normal industrial environments, more frequently in dirty or humid conditions
   b. Verify correct positioning in the flame and replace damaged or degraded components

10. Ignition electrodes (if separate from flame sensor):
    a. Periodically check position, tip spacing (per manufacturer), and insulation condition

b. Remove deposits, correct misalignment, and replace cracked or degraded electrodes

11. Burner head, diffuser, and air passages: Inspect and clean at intervals defined by dust and deposit accumulation to maintain correct air flow and flame shape

12. Gas filters/strainers: Clean or replace based on differential pressure indication, gas cleanliness, and operating hours

13. Solenoid valves and regulators: During functional tests and start/stop sequences, verify correct opening/closing response and absence of leakage when closed; repair or replace if operation is sluggish or internal leakage is detected

E. Performance Checks (Quarterly / Semi-Annual)

14. Perform combustion analysis (O_2, CO, CO_2, flue gas temperature) at representative firing rates and adjust air/gas ratio if combustion quality has deteriorated

15. Verify gas supply pressure at burner inlet and compare with design/commissioning values; check stability under varying load

16. Inspect air damper linkages, cams, and adjustment screws for wear and tightness; recalibrate stroke and setpoints as necessary

F. Safety Devices and Interlocks (At Least Annually, Plus Site Program)

17. Test all safety devices and interlocks at least annually or as required by codes, insurance, or site risk assessment

18. Tests shall cover at minimum:
a. Flame failure detection system, including response time to simulated loss of flame

b. Gas pressure switches (min/max), combustion air proving switches, and valve proving/leak test systems
c. Operating and high limit temperature/pressure controls and related safety shut-off functions

19. Verify the burner management sequence (pre-purge, trial for ignition, flame proving, post-purge) for correct timing and response
20. Check chimney and flue gas path for blockage, condensate, or corrosion; clean and repair as necessary
21. Inspect combustion chamber refractory or lining for cracks, spalling, or damage from flame impingement or overheating; repair per boiler manufacturer recommendations
22. Document all tests and results (checklists signed by the person performing the test) and retain as part of burner safety and compliance records

G. Annual Overhaul and Recommissioning

23. Perform a comprehensive burner overhaul at least once per year or per OEM recommendations, including:
    a. Inspection and cleaning of burner head and mixing components
    b. Inspection and service of ignition system (transformer, cables, electrodes)
    c. Inspection and functional testing of flame detection system
    d. Inspection and service of gas valves, regulators, and gas train assemblies
    e. Inspection of air damper assembly and actuator
24. Replace consumable items (seals, gaskets, filters, ignition or sensing components) according to operating hours and manufacturer recommendations

25. After reassembly, carry out a full recommissioning:
    a. Verify complete start/stop sequence, including all safety interlocks and purge cycles
    b. Perform detailed combustion testing across the operating range and optimize settings
    c. Update records with measured values, final setpoints, parts replaced, and any deviations from the original data sheet

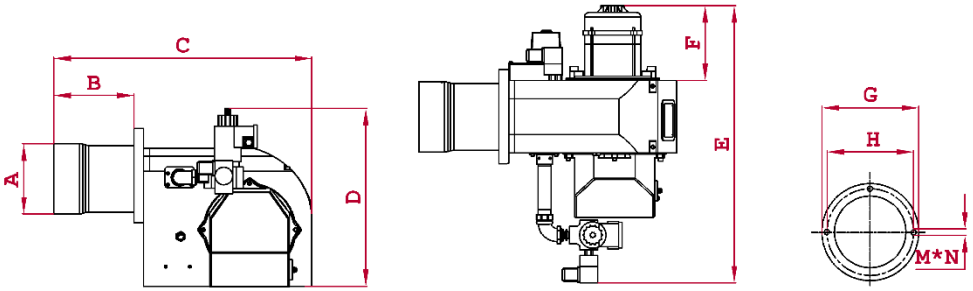
H. Lockouts and Immediate Service

26. Repeated burner lockouts or safety trips indicate abnormal conditions. Repeated attempts to restart the burner without identifying and correcting the root cause are prohibited; the system must be inspected and repaired before being returned to service

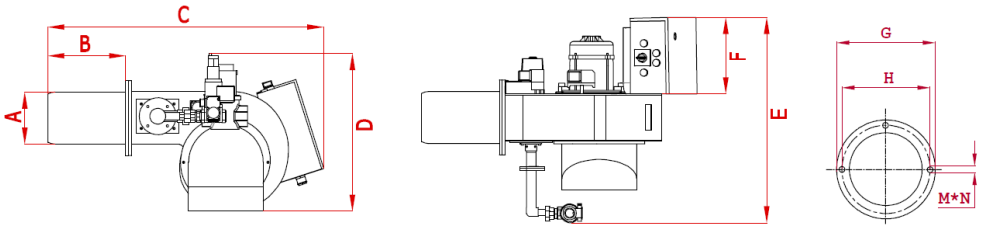
27. Immediate controlled shutdown and service intervention are required if any of the following occur:
    a. Flame instability, delayed ignition, or frequent failed starts
    b. Abnormal noise, vibration, or signs of overheating
    c. Presence of gas odor or evidence of unburned fuel in the furnace or flue
    d. Suspected malfunction, bypassing, or defeat of any safety or interlock device

OVERALL DIMENSIONS

GNG 90/3, 90/4



GNG 90/5



Model	A	B	C	D	E	F	G	H	M	N
GNG 90/3	145	155	580	435	570	150	198	175	12	3
GNG 90/4	145	155	580	450	570	150	198	175	12	3
GNG 90/5	160	240	850	490	660	250	230	193	13	3

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TECHNICAL INFORMATION

Model	OPERATION	FUEL TYPE	FUEL CONSUMPTION
GNG 90/3	1 STAGE	NATURAL GAS	9.7 – 38.9 m^3/h
GNG 90/4	1 STAGE	NATURAL GAS	11.4 – 51.5 m^3/h
GNG 90/5	1 STAGE	NATURAL GAS	14.9 – 62.9 m^3/h

Model	GNG 90/3	GNG 90/4	GNG 90/5
CONTROL BOX	G790	G790	G790
ELECTROMOTOR	0.45 kW - 1Ph - 3000rpm	0.45 kW - 1Ph - 3000rpm	0.75 kW - 3Ph - 3000rpm
*** GAS SAFTY VALVE**	1 " Fast opening	1 ½ " Fast opening	1 ½ " Fast opening
GAS SOLENOID VALVE	1 " Slow opening	1 ½ " Slow opening	1 ½ " Slow opening
GAS PRESSURE SWITCH	2.5 – 50 mbar	2.5 – 50 mbar	2.5 – 50 mbar
AIR PRESSURE SWITCH	0.4 - 3 mbar	0.4 - 3 mbar	0.4 - 3 mbar
IGNITION DEVICE	15KV	15KV	15KV
AIR DAMPER CONTROL	Manual	Manual	Manual
FLAME SENSOR	Ionization probe	Ionization probe	Ionization probe
BLOWER	180*70 -12.7mm	200*80 -12.7mm	225*90 -12.7mm
*** GAS FILTER**	1"	1 ½"	1 ½"

*** Optional**

(In GNG 90.5 model gas filter supplied by manufacture)

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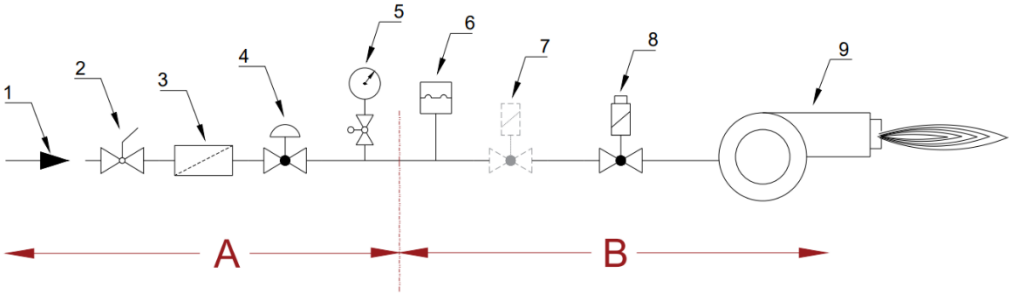
FUEL LINE

GNG 90/3, 90/4, 90/5:



	Number	Item	GNG 90/3	GNG90/4	GNG90/5
By Costumer	1	Gas Inlet	1 ”	1 ½”	1 ½”
	2	Manual Gas Valve	1 ”	1 ½”	1 ½”
	3	Gas Filter	1 ”	1 ½”	1 ½”
	4	Gas Pressure Regulator	1 ”	1 ½”	1 ½”
	5	Manometer and Push button	0-250 mbar	0-250 mbar	0-250 mbar
	7	Gas Safety Valve	1 ”	1 ½”	1 ½”
By Manufacture	6	Gas Pressure Switch	2.5-50 mbar	2.5-50 mbar	2.5-50 mbar
	8	Gas Solenoid Valve	1 ”	1 ½”	1 ½”
	9	Burner	Yes	Yes	Yes

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