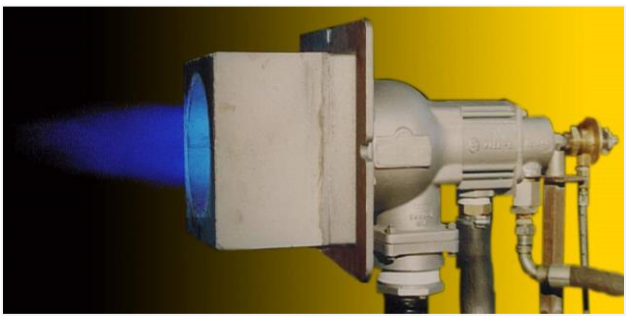
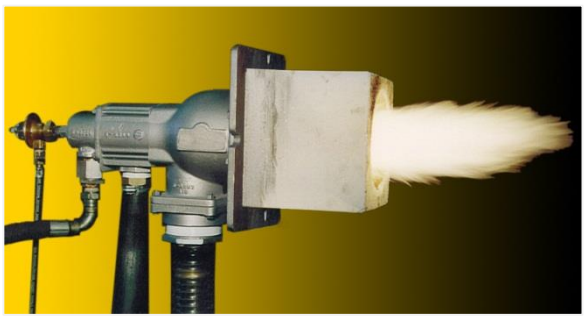
MEDIUM VELOCITY DUAL FUEL BURNERS

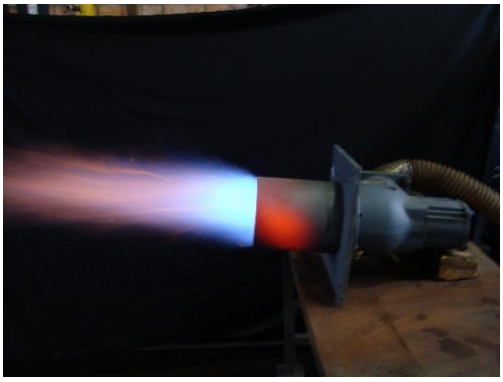
MGO dual fuel burners are widely used on heat treat and melting furnaces, kilns, ovens, air heaters, dryers, chemical process equipment and other applications where a superior temperature uniformity is required.
These sealed–in nozzle–mix burners for gas and/or distillate oil are stable on a stoichiometric ratio, with large amounts of excess air or with up to 50% excess fuel (provided additional air for combustion is in the furnace near the burner).
The new type of these burners with Sic tip- called MG/S Could use for temperatures up to 1450°C (Figure 3). It would be considered that MG/S burner often is easier to install than a conventional burner with tile.



MGO Burner in Gas Mode



MGO Burner in Oil Mode



MGO/S Burner

OPERATION

Burners can be lighted at rich, lean or correct air/fuel ratio then immediately turned to high fire. Required gas pressures are low for natural gas. Required oil pressure at burner is nearly zero, But a pressure drop should be taken across the adjustable oil valve (ADOV).
The most common ratio control system for these Burners uses a cross-connected regulator. When appropriate for the application, flow alancing systems or fuel only control (see"Excess Air" paragraph) is very satisfactory.
If furnace temperatures after shutdown rise above 1000 oC, pass some air through the burner to prevent overheating. During gas operation, use at least 16mbar atomizing air to cool atomizer(full atomizing air may be used); or for extended periods of operation on gas, atomizer can be drawn and stored: Use a backplate and gasket to seal the rear of the burner.

LIGHTING/FLAME SUPERVISION

An MNG pilot is normally used to light these burners. On gas, direct spark ignition of the burner is available. A manual torch can be used in some applications.
Burners accept ultraviolet (UV) scanners for monitoring pilot or main flame. A flame rod can be used to monitor pilot or main gas fire.
When using flame supervision, an interrupted pilot is required– do not use constant or intermittent pilots. If using direct spark ignition, turn off spark after burner lights. All burners are furnished with an observation port. A lighter hole cover is supplied if a pilot is not ordered. The position of pilot, flame detector, and observation port are interchangeable as long as pilot and flame detector are mounted in adjacent holes.

EXCESS AIR

Excess air improves temperature uniformity by avoiding hot spots in front of burners, churning furnace atmosphere to reduce stratification and creating positive furnace pressure to eliminate cold air infiltration.
Excess air can give very high effective burner turn down. Thus a furnace used for high-temperature work with burners firing on stoichiometric air/fuel ratio can also be used for low-temperature jobs with burners firing on a lean ratio.

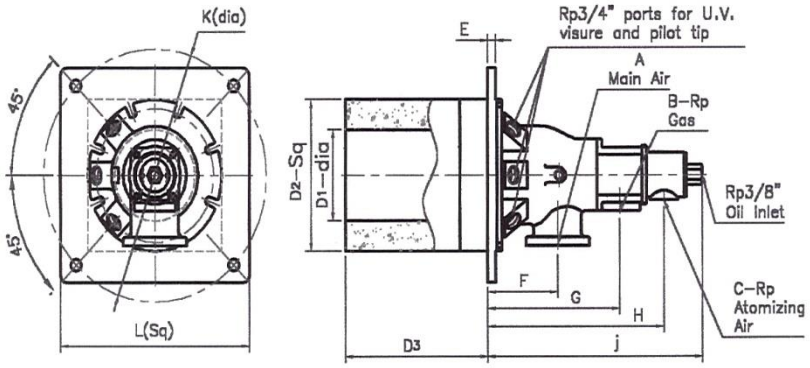
Burner Model	Kcal/hr at 70 mbar (air pressure)	Flame Length with 70 mbar (air pressure) (cm)	
		Oil	Gas
30MGO(S,R,M)	30,000	35	40
50MGO(S,R,M)	50.000	40	45
80MGO(S,R,M)	80.000	50	55
150MGO(S,R,M)	150,000	60	75
250MGO(S,R,M)	250,000	75	75
390MGO(S,R,M)	390,000	90	120
680MGO(S,R,M)	680,000	180	180
840MGO(S,R,M)	840,000	180	150
1100MGO(S,R,M)	1,100,000	210	180
1500MGO(S,R,M)	1,500,000	220	230
1900MGO(S,R,M)	1,900,000	240	250
2400MGO(S,R,M)	2,400,000	260	260
3000MGO(S,R,M)	3,000,000	280	300

- This burner can be ordered as single fuel too**.**

MEDIUM VELOCITY DUAL FUEL BURNERS

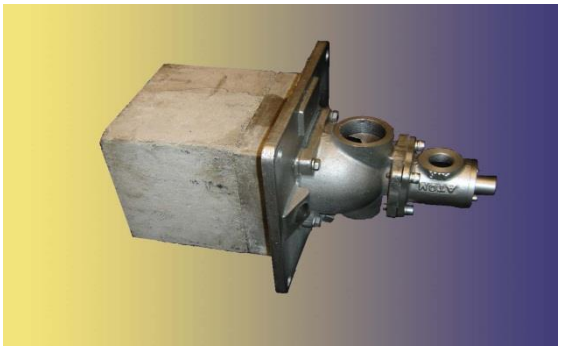
CONSTRUCTION FEATURES (MGO Models)

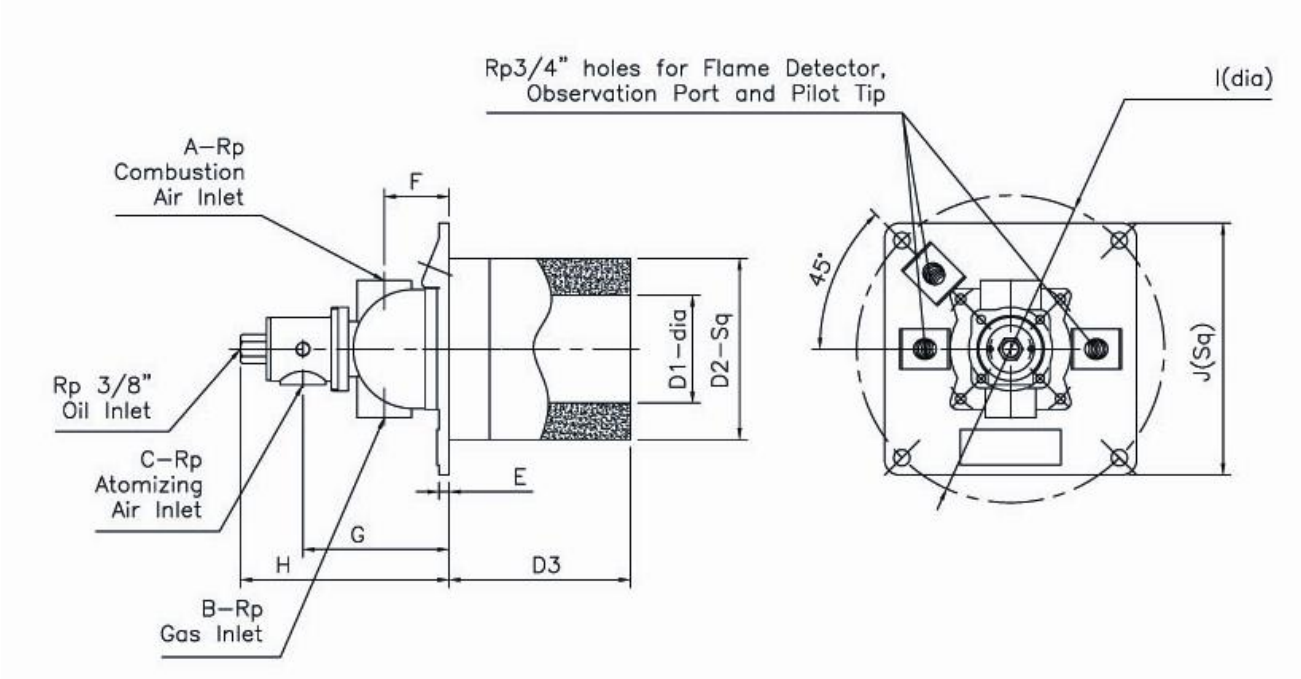
Air and gas inlets can be rotated in 90º intervals, but air and gas pipes should be brought in from the top or side to prevent oil dripping into them.
Mounting plates are cast iron. Standard tiles are 225mm long. For thicker furnace walls, tunnel beyond the end of tile should be flared at least 30º included angle, starting at tile OD. Extension tiles are not recommended.
For installation convenience, burner body can be separated from the mounting plate and tile assembly. But tile must be set in the wall with pilot and flame detector notches in proper location relative to intended burner body position.



BURNER Design	A in	B in	C in	D1 mm	D2 mm	D3 mm	E mm	F mm	G mm	H mm	J mm	K mm	L mm
150 MGO/R	2	1	1	130	216	230	13	114.5	215.5	288	350	360	305
250 MGO/R	3	1.1/2	1	130	216	230	13	114.5	215.5	288	350	360	305
390 MGO/R	3	1.1/2	1	130	216	230	13	114.5	215.5	288	350	360	305
680 MGO/R	4	2	1.1/2	181	252	230	15	142	282	387	459	400	340
840 MGO/R	4	2	1.1/2	181	252	230	15	142	282	387	459	400	340
1100 MGO/R)	6	2	2	181	252	230	15	142	282	387	459	400	340

*Lower heat capacity burners model **MGO** dual fuel burners.*

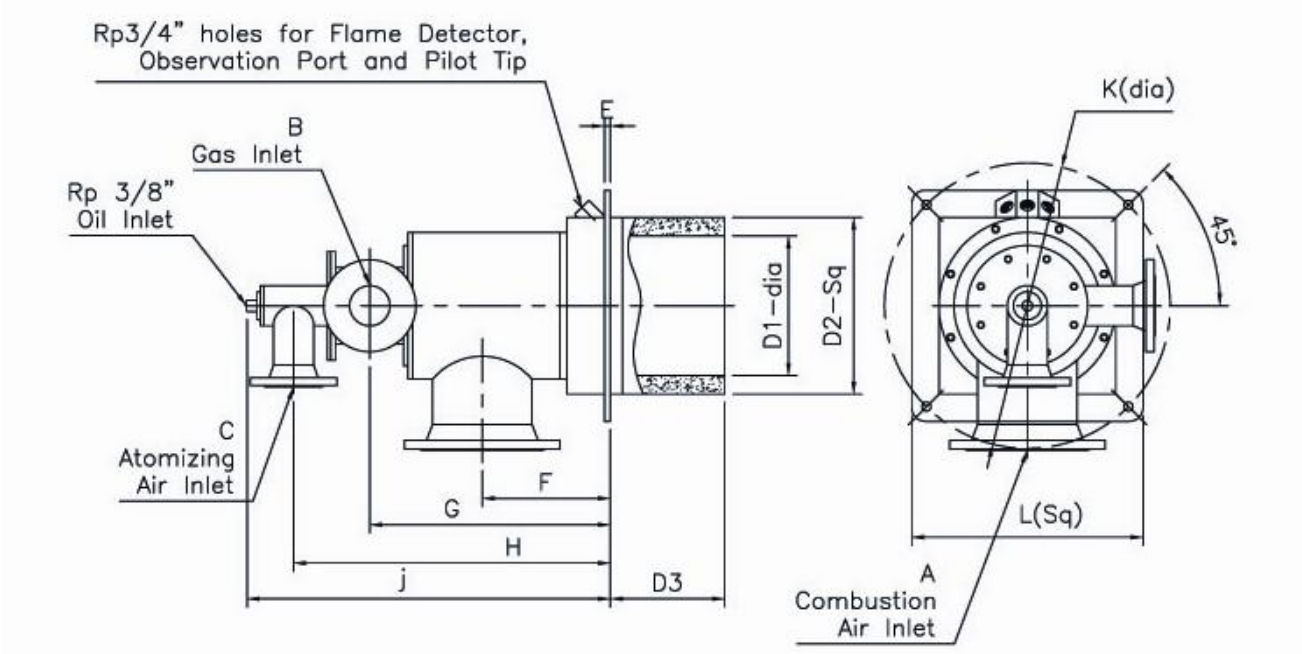




BURNER Design	A in	B in	C in	D1 mm	D2 mm	D3 mm	E mm	F mm	G mm	H mm	I mm	J mm
30 MGO/R	1.1/2	3/4	3/4	107	180	180	10	64.2	145	208.5	305	250
50 MGO/R	1.1/2	3/4	3/4	107	180	180	10	64.2	145	208.5	305	250
80 MGO/R	1.1/2	3/4	3/4	107	180	180	10	64.2	145	208.5	305	250

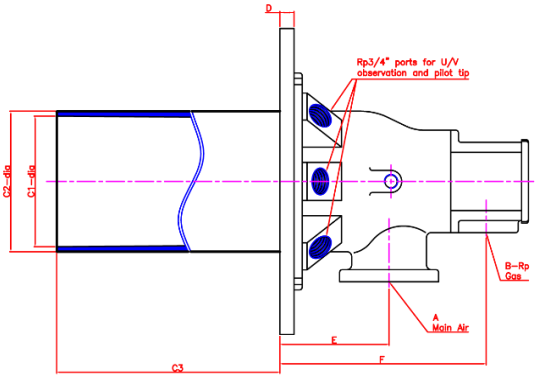
*Higher heat capacity burners model **MGO** dual fuel burners.*

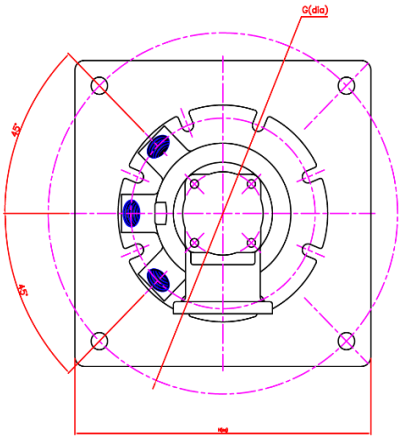
MEDIUM VELOCITY DUAL FUEL BURNERS



BURNER Design (S,R,M)	A in	B in	C in	D1 mm	D2 mm	D3 mm	E mm	F mm	G mm	H mm	J mm	K mm	L mm
1500 MGO/R	6	2	2	244	390	252	13	260	445.5	549	618	630	510
1900 MGO/R	6	2	2	308	390	252	13	260	445.5	549	618	630	510
2400 MGO/R	8	3	2	308	390	252	13	282.5	530.5	698.5	802	630	510
3000 MGO/R	8	3	2	308	390	252	13	282.5	530.5	698.5	802	630	510

MG/S Dimensions :





BURNER Design	A in	B in	C1 mm	C2 mm	C3 mm	D mm	E mm	F mm	G mm	H mm
150 MG(S,M)	2	1	130	140	230	15	114.5	215.5	360	305
250 MG(S,M)	3	1.1/2	130	140	230	15	114.5	215.5	360	305
390 MG(S,M)	3	1.1/2	130	140	230	15	114.5	215.5	360	305
680 MG(S,M)	4	2	178	188	230	15	142	282	400	340
840 MG(S,M)	4	2	178	188	230	15	142	282	400	340
1100 MG(S,M)	6	2	178	188	230	15	142	282	400	340

MEDIUM VELOCITY DUAL FUEL BURNERS

INSTALLATION

1- Requirements:

a) Maximum allowable inlet pressure to the gas governor is 500 mbar. If greater than 500 mbar, an upstream pressure regulator must be used.
b) Gas supply pressure to the gas governor should be at least 14 mbar greater than the high fire burner air pressure. If less, a bleeder must be installed in the impulse line.
c) Fuel oil must be supplied to the oil governor at 3 bar. Oil should be supplied from a circulating system controlled by a diaphragm relief valve or regulator.
d) Atomizing air pressure at burner must be at least 70 mbar.
e) Consult your SHOLEH SANAT engineer for automatic shut off and flame supervision requirements.

2- Burner Mounting:

a) Burners should be mounted with air, gas, pilot, and UV connections on the top or side to prevent oil dripping into them.
b) WARNING: Burners cannot be rotated with respect to the mounting plate as the pilot and flame detector ports must align with notches in the plate
c) To minimize leaks around the tile and to prevent tile damage from thermal expansion of the wall, follow the instructions of SHOLEH SANAT.

3- Piping:

a) Minimize piping pressure losses. Use a minimum of elbows. Substitute 45º elbows for 90º elbows when possible. Do not use street elbows. Use pipe (not tubing) for pilot air and gas lines. 1/4″ tubing may be used for impulse lines up to 3 m long, 1/2″ tubing or larger for longer runs.
b) Pipe air and fuel lines in a manner similar to that shown in Figure 1. Flexible connections are recommended in air and fuel lines to minimize strain from piping and thermal expansion.
c) Pilot air, gas and atomizing air supply connections must be made upstream of primary burner controls so that they are not affected by the zone air control and gas shutoff valves.
d) Connect impulse piping as shown in Figure 1. These piping arrangements are designed to keep air and gas flows on the desired ratio at all firing rates.
e) Ratio regulator impulse line connections must be located between the zone control air valve and the manual burner air valve for multiple burner zones and downstream of the manual burner air valve for single burners.

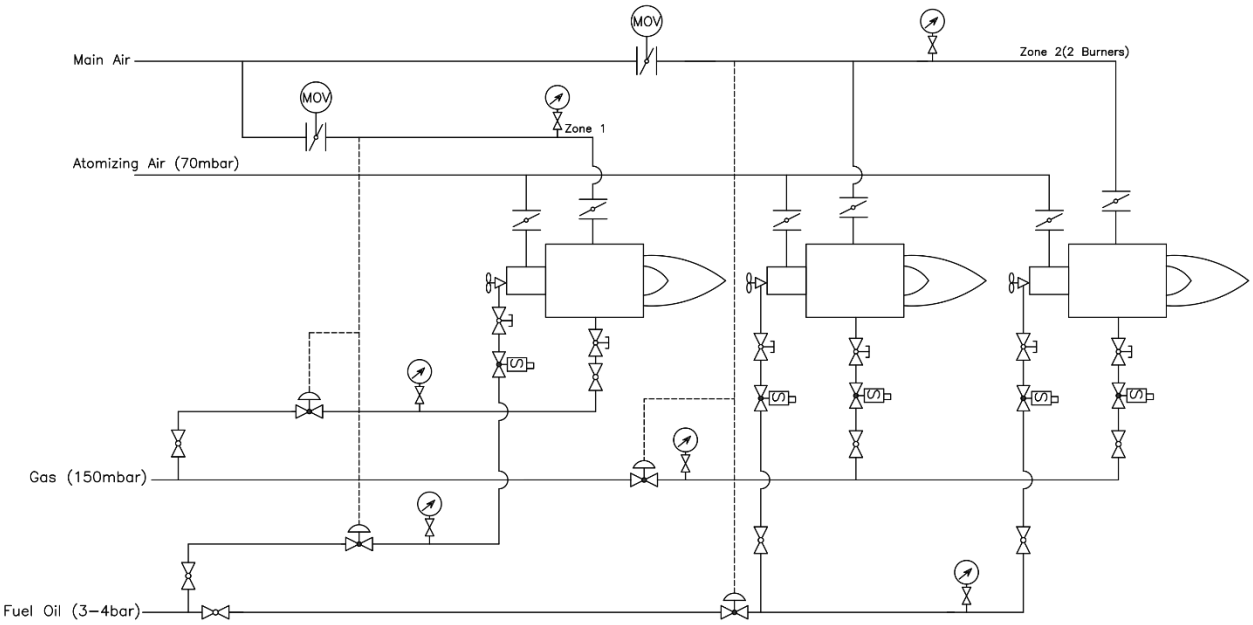


Figure 1: Suggested Piping Arrangement for MGO Burner

LIGHTING AND ADJUSTMENT

1- Basic

a) All manual and automatic fuel valves (gas and oil) must be closed.
b) Open all furnace doors and flue dampers. Lock all burner air valves in full open position.
c) Start combustion air blower and check rotation.
d) Adjust damper motor/air valve linkage(s) for low and high fire.
e) Set atomizing air pressure at 70 mbar. (NOTE: Atomizing air can be set at 16mbar for gas firing but must be returned to 70 mbar for oil firing).
f) Set damper motor(s) at high fire allowing the furnace to purge for several minutes prior to lighting. Check motor amps with all burners at high fire. If in overload, adjust the linkage to reduce the high fire airflow.
g) Return the damper motor to low fire. Linkage must not bind.

2- Light the pilots in accordance with the pilot instruction sheet.

3- Gas Firing:
   a) Open gas adjustable valve fifty percent (ADV) from a full closed position.
   b) Open gas shutoff valve(s), if burner does not light within a few seconds, close gas shutoff valve and open gas adjustable valve one more time, then open gas shutoff valve. Repeat as necessary until burner lights.
   c) Slowly open main air valve to high fire position, adjustable valve as necessary.
   d) Return control valve to low fire position. Adjust gas governor for the desired flame.
   e) Repeat steps (c) and (d) if necessary.

4- Oil Firing:

   a) Set atomizing air at 70mbar for light oil (100 mbar for heavy oils).
   b) Open oil shutoff valve. Purge air from line by breaking oil line at Adjustable oil valve collecting oil in a bucket or other container until the flow is free of air.
   c) Adjust oil supply for 3 bar at oil governor inlet.
   d) Open oil Adjustable valve until burner lights.
   e) Slowly open main air valve to high fire position. Adjust oil adjustable valve as necessary.
   f) Return control valve to low fire position. Adjust the oil governor for the desired flame.
   g) Repeat steps (e) and (f) if necessary. Set oil adjustable valve detent at high fire setpoint.
   h) When shutting down, turn off the oil valve upstream of oil governor. Allow to purge, the shut the oil adjustable valve.

5- Trouble shooting :
   A. Gas Operation
      a) Gas supply pressure too high or too low (see appropriate regulator literature).
      b) Impulse pressure too low to the gas governor - check for dirt in line or connections, check method of connecting impulse line to air pipe.
      c) Governor not controlling -check method of connecting impulse line to air pipe, check governor diaphragms (see governor literature), if bleeder is used, check orifices for dirt.

   B. Oil Operation
      - If the fire is " sloppy", check atomizing air pressure: at least 70 mbar for light oil, at least 100 mbar for heavy oil.
      - If fire "spits" or tends to be unstable, check for air in oil (a suction line leak, usually at the pump) or water or dirt in the oil lines (check filters, oil tank, atomizer, etc.)