

## **NOZZLE MIX COMBINATION BURNER WITH SWING-A-WAY BRACKET**

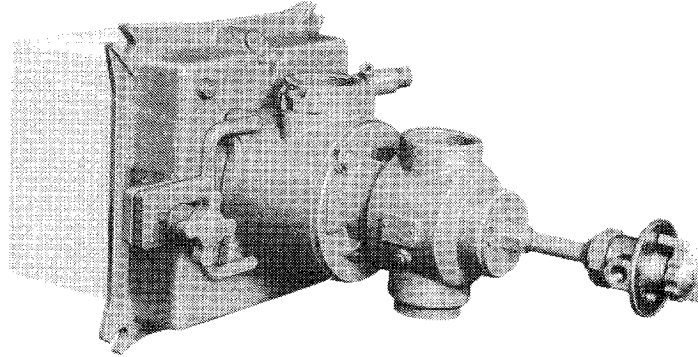


Fig. 1 - NMC200 Series Burner With Swing-A-Way Bracket.

### **A. GENERAL INFORMATION**

The NMC Series Nozzle Mix Burner is designed for applications requiring a general purpose, long-life, low maintenance burner. The NMC performs equally well when firing "on ratio", with excess fuel, or with excess air. The NMC will burn any clean industrial gas, No. 2 oil, or a combination of gas and oil. These units will not operate on No. 6 or a mixture of heavy oil and distillate oil.

NMC burners can be controlled manually or automatically. Automatic control normally employs a Hauck Ratio Regulator for each control zone to maintain air-fuel ratio. An alternate system uses control valves in each of the fuel and air lines, linking the valves to a single motor controller.

The burner assembly is equipped with a swing-a-way bracket. This feature allows the inspection and cleaning of the burner and the ignition tile from outside of the furnace. The presence of air and gas line quick disconnects and flexible oil supply lines facilitates the use of the door.

### **B. RECEIVING AND INSPECTION**

Upon receipt, check each item on the bill of lading and/or invoice to determine that all equipment has been received. A careful examination of all equipment should be made to ascertain if there has been any damage in shipment.

If installation is delayed and the equipment is stored outside, then provide adequate weather protection as dictated by climate and period of exposure.

These instructions are intended to serve as guidelines covering the installation, operation, and maintenance of Hauck equipment. While every attempt has been made to ensure completeness, unforeseen or unspecified applications, details, and variations may preclude covering every possible contingency. **WARNING: TO PREVENT THE POSSIBILITY OF SERIOUS BODILY INJURY, DO NOT USE OR OPERATE ANY EQUIPMENT OR COMPONENT WITH ANY PARTS REMOVED OR ANY PARTS NOT APPROVED BY THE MANUFACTURER.** Should further information be required or desired or should particular problems arise which are not covered sufficiently for the purchaser's purpose, contact Hauck Mfg. Co.

**C. CAPACITY TABLES**

O N R A T I O N A L	NMC BURNER NO.	AIR PRESSURE													
		4 oz.		6 oz.		8 oz.		12 oz.		16 oz.		20 oz.		24 oz.	
		AIR CFM	BTU CAP IN 1000 BTU/hr	AIR CFM	BTU CAP IN 1000 BTU/hr	AIR CFM	BTU CAP IN 1000 BTU/hr	AIR CFM	BTU CAP IN 1000 BTU/hr	AIR CFM	BTU CAP IN 1000 BTU/hr	AIR CFM	BTU CAP IN 1000 BTU/hr	AIR CFM	BTU CAP IN 1000 BTU/hr
210	33.5	183	41	224	47.3	258	58	316	67	365	75	409	82	447	
215	70	382	86	469	99	540	121	660	140	764	157	856	172	938	
220	132	720	161	878	186	1015	228	1244	263	1435	294	1604	322	1757	
230	272	1484	333	1817	385	2100	471	2569	544	2968	608	3317	666	3633	
240	413	2253	505	2755	583	3180	714	3895	825	4500	922	5030	1011	5515	
260	780	4255	955	5210	1103	6017	1351	7370	1560	8510	1744	9514	1911	10425	
180*	1602	9231	1962	11305	2265	13054	2775	15988	3204	18462	3582	20641	3924	22611	
1100*	2615	15068	3203	18454	3698	21309	4529	26098	5230	30135	5847	33692	6405	36908	

\*When firing on gas only, the primary air must be used along with the secondary air.

Table 1.

O N R A T I O N A L	NMC BURNER NO.	AIR PRESSURE																			
		4 oz.				8 oz.				16 oz.				20 oz.				24 oz.			
		PRI AIR CFM @ 16 oz.	SEC AIR CFM	BTU CAP IN 1000 BTU/hr	OIL CAP GPH	PRI AIR CFM @ 16 oz.	SEC AIR CFM	BTU CAP IN 1000 BTU/hr	OIL CAP GPH	PRI AIR CFM @ 16 oz.	SEC AIR CFM	BTU CAP IN 1000 BTU/hr	OIL CAP GPH	PRI AIR CFM @ 20 oz.	SEC AIR CFM	BTU CAP IN 1000 BTU/hr	OIL CAP GPH	PRI AIR CFM @ 24 oz.	SEC AIR CFM	BTU CAP IN 1000 BTU/hr	OIL CAP GPH
210	7.2	33.5	204	1.5	7.2	47.3	273	2.0	7.2	67	371	2.7	8.0	75	415	3.0	8.8	82	454	3.3	
215	14.3	70	422	3.0	14.3	99	567	4.1	14.3	140	773	5.6	16.0	157	865	6.3	17.5	172	948	6.9	
220	28.3	132	802	5.8	28.3	186	1072	7.8	28.3	263	1458	10.6	31.6	294	1628	11.8	34.7	322	1785	12.9	
230	57	272	1645	11.9	57	385	2210	16.0	57	544	3005	21.8	64	608	3360	24.3	70	666	3680	26.7	
240	76	413	2445	17.7	76	583	3295	23.9	76	825	4505	32.6	85	922	5035	36.3	93	1011	5520	40.6	
260	148	780	4640	33.6	148	1103	6255	45.3	148	1560	8540	61.9	165	1744	9545	69.2	181	1911	10460	75.8	
180	359	1423	9068	65.7	359	2011	12060	87.4	359	2845	16304	118	402	3180	18227	132	440	3485	19972	144.7	
1100	830	2200	15418	111.7	830	3111	20054	145.3	830	4400	26613	192.8	930	4919	29763	215.7	1020	5390	32617	236.4	

Table 2.

NOTES FOR TABLES 1 AND 2 :

- 1—Fuel capacity based on 138,000 BTU/gal oil and 20 % excess air. Natural gas 1040 Btu/Cu. Ft. with 10% excess air.
- 2—Air pressure is "total pressure" measured 6 pipe diameters from burner.

- 3—Oil Pressure should be at least 5-10 psig at the burner.
- 4—Natural gas pressure required at the burner is 6" W.C. for capacity listed at 16 oz. air pressure.
- 5—Capacities for preheated air operation will differ from those shown.

**D. EXCESS AIR**

GAS — MAXIMUM % EXCESS AIR

NMC BURNER NO.	AIR PRESSURE		
	4 oz.	8 oz.	16 oz.
210	600	600	600
215	600	600	600
220	600	600	600
230	600	600	600
240	200	300	400
260	400	600	400
180	100	100	100
1100	300	500	700

Table 3.

OIL — MAXIMUM % EXCESS AIR

NMC BURNER NO.	AIR PRESSURE		
	4 oz.	8 oz.	16 oz.
210	30	30	250
215	200	250	350
220	100	170	350
230	100	250	400
240	100	350	400
260	400	500	500
180	200	200	250
1100	200	300	500

Table 4.

**EFFECTS OF EXCESS AIR**

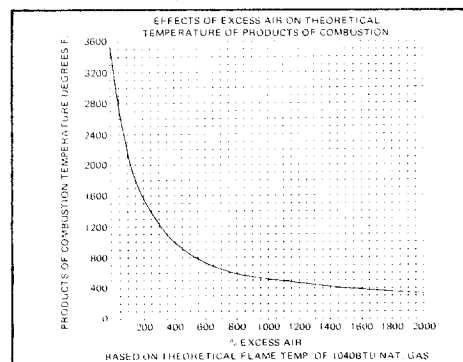


Fig. 2 — Chart No. GY834

TO USE CHART—Determine maximum temperature at which combustion gases are to enter furnace. Follow that temperature line horizontally from scale on the left until it intersects curve; then drop vertically down to read % excess air required at bottom.

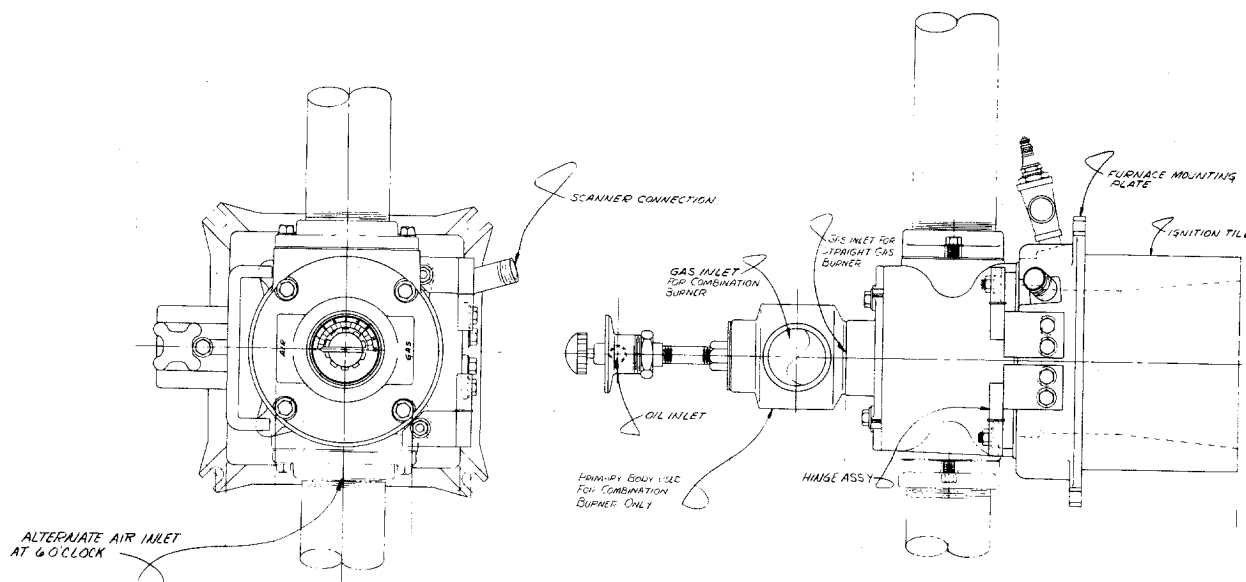
## E. INSTALLATION

1. Furnish an opening in the furnace wall slightly larger than the outside dimensions of the refractory tile. Since NMC burners can fire in any position, they can be installed through the roof, walls or bottom of the furnace.

### IMPORTANT

*Do not disassemble the tile from the burner mounting assembly to install them separately. The burner and tile are factory assembled with a sealant between them. Disassembly will destroy the effectiveness of this sealant.*

2. Inspect the mounting assembly. Ensure that all bolts connecting the burner to the mounting plate and those connecting the mounting plate to the refractory tile are securely fastened.
3. "Butter" the outside surfaces of the tile with fire clay.
4. Insert the tile into the furnace wall. For best results, install a high temperature gasket between the furnace wall and the mounting plate.



5. Bolt the mounting plate to the furnace wall.
6. Ensure that a complete seal exists between the mounting assembly, the tile and the furnace wall.

### CAUTION

*The burner mounting plate is designed to support the weight of the burner only. Ensure that all piping is adequately supported by an external means other than the mounting assembly.*

NOTE

*Install flexible hose and couplings as required in the gas, oil, and air lines. The burner position and furnace condition will dictate the best location for these items.*

7. Install the secondary air line at the appropriate burner connection. If required due to the placement of the air piping, the air inlet can be rotated from a 12 o'clock position to a 6 o'clock position.

IMPORTANT

**NMC210-230 Burners only** - If the pilot and air are to be in line (12 o'clock secondary air position) a 45° No. 1 spark ignited gas pilot must be used to avoid interference.

To rotate the inlet, accomplish the following:

- A. Remove all the screws which hold the burner assembly to the mounting plate.
  - B. Rotate the entire burner assembly to the allowable position which best suites the required piping connection.
  - C. Replace and securely tighten all the screws which connect the burner assembly to the mounting plate.
  - D. Loosen and remove all of the hex screws on the burner backplate. The number of screws will depend on the burner size.
  - E. Rotate the burner backplate, with its attached nozzle assembly, until the word "pilot" on the backplate is realigned with the pilot opening in the mounting bracket. For proper operation, it is **imperative that this alignment be established and maintained.**
  - F. Ensure that the gasket between the backplate and the burner body is properly seated.
  - G. Replace and tighten all of the hex screws on the burner backplate.
8. Install the primary air and gas lines at the appropriate connections on the atomizer body. If required due to the placement of the primary air and/or gas piping, the atomizer body can be rotated to achieve the alignment required for a proper connection. To accomplish this, simply complete the following:
    - A. Loosen the set screw holding the atomizing body in position.
    - B. Rotate the body until the air and gas inlets are properly aligned with the piping.
    - C. Ensure that the atomizer body is firmly seated against the secondary air body and that the position of the O-ring is correct.
    - D. Tighten the set screw.
  9. NMC burners No. 260, 180, and 1100 ONLY. All other burner sizes proceed to step 10. Connect the oil valve in line with the oil inlet. The position of the valve and the length of the connection piping will depend on the application.
  10. Install the oil line at the oil inlet of the control valve. If necessary, rotate the oil valve to properly align the valve inlet with the oil piping.

11. Insert the pilot and flame detection system (if used) into the appropriate ports on the mounting plate. The use of a Hauck blast type gas pilot (either spark or manually ignited) is recommended. **Ensure that the pilot is placed in the port specifically designated for it.** The ports on all burners except No. 180 and No. 1100 are normally equipped with a slip-fit cap and a set screw. Burners No. 180 and No. 1100 are provided with threaded ports. If the furnace back pressure exceeds 1" water column, threaded ports are mandatory. For proper installation, consult the instructions which accompany the pilot and detection system chosen.
12. Ensure that the piping does not restrict the movement of the swing-a-way door by accomplishing the following:
  - A. Break the quick disconnects in the main air and gas lines.
  - B. Loosen the bar nut restraining the door.
  - C. Slowly open the door completely.
  - D. Adjust any piping which restricts the free movement of the door.
  - E. Close the door and secure it in place with the bar nut.
  - F. Reconnect the two quick disconnects.

## F. OPERATION

Once installed, the burner is ready for operation. The NMC burner is designed to operate with the air, oil, and gas pressure best suited to the application. Capacity and excess air tables are given in Sections C and D of these instructions.

It is recommended that the burner be ignited under low fire conditions. When the burner is operating, the pilot can be shutoff since the burner is designed to maintain ignition of the fuel-air mixture.

The NMC mounting plate is provided with a port for monitoring the pilot and main flame, using a UV scanner or other suitable device. If the pilot and secondary air are to be in line, a 45° No. 1 spark ignited gas pilot must be used with NMC210-230 model to avoid interference.

Burners intended for *preheated air* operation are identified by the letter "H" immediately preceding the Model Number figures. Preheated air up to 800° F maximum may be utilized. Atomizing air is maintained at ambient conditions during preheated air operation.

## G. MAINTENANCE

The NMC Series burner has no moving parts requiring any lubrication. However, periodic cleaning may be required to remove dirt and soot build-up inside the burner air passages caused by a dirty air supply or soot blow back from the furnace during periods of shut down.

To maintain peak performance, oil valves and atomizers should also be periodically cleaned of varnish and any soot deposits. To remove the oil valve/atomizer assembly, accomplish the following:

- A. Disconnect the oil line at the control valve inlet (if required).
- B. Remove all of the screws on the atomizer backplate.
- C. Extract the entire oil assembly.
- D. Clean off all of the particles and residue using kerosene and a soft-wire brush.
- E. Reinsert the assembly into the atomizer body.
- F. Ensure that the backplate gasket is in good condition and properly seated in place.
- G. Replace all of the screws on the atomizer backplate.
- H. Reconnect the oil line at the control valve (if required).
- I. Burners equipped with self-cleaning "S" valves should have the valve handles turned through the "clean" zone to remove any dirt in the metering mechanism. The valve should then be reset to its previous setting.

Periodically check the refractory tile for coke build-up or other damage.