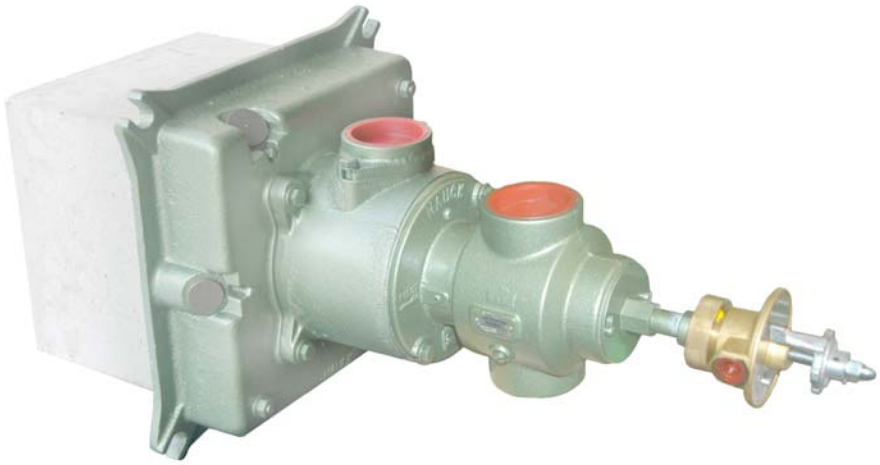
NOZZLE MIX COMBINATION BURNER
NMC200 SERIES



WARNING

These instructions are intended for use only by experienced, qualified combustion start-up personnel.

Adjustment of this equipment and its components, by unqualified personnel, can result in fire, explosion, severe personal injury, or even death.

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.

WARNING

This equipment is potentially dangerous with the possibility of serious personal injury and property damage. Hauck Manufacturing Company recommends the use of flame supervisory equipment and fuel safety shutoff valves. Furthermore, Hauck urges rigid adherence to National Fire Protection Association (NFPA) standards and insurance underwriter's requirements. Operation and regular preventative maintenance of this equipment should be performed only by properly trained and qualified personnel. Annual review and upgrading of safety equipment is recommended.

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 air lines, linking the valves to a single motor controller.

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 parts should be made to ascertain if there has been any damage in shipment.

IMPORTANT

If the installation is delayed and the equipment is stored outside, provide adequate protection as dictated by climate and period of exposure. Special care should be given to all motors and bearings, if applicable, to protect them from rain or excessive moisture.

C. CAPACITIES

ON RATIO GAS	NMC BURNERS NO.	AIR PRESSURE 4 oz. AIR CFM	4 oz. BTU CAP IN 1000 BTU/hr	6 oz. AIR CFM	6 oz. BTU CAP IN 1000 BTU/hr	8 oz. AIR CFM	8 oz. BTU CAP IN 1000 BTU/hr	12 oz. AIR CFM	12 oz. BTU CAP IN 1000 BTU/hr	16 oz. AIR CFM	16 oz. BTU CAP IN 1000 BTU/hr	20 oz. AIR CFM	20 oz. BTU CAP IN 1000 BTU/hr	24 oz. AIR CFM	24 oz. BTU CAP IN 1000 BTU/hr
	210	35.5	193	43.4	237	50.2	278	62.6	341	72.1	393	81.1	442	88.8	484
	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

Table 1.

ON RATIO OIL	NMC BURNER NO.	AIR PRESSURE 4 oz. PRI AIR CFM @ 16 oz.	4 oz. SEC AIR CFM	4 oz. BTU CAP IN 1000 BTU/hr	4 oz. OIL CAP GPH	8 oz. PRI AIR CFM @ 16 oz.	8 oz. SEC AIR CFM	8 oz. BTU CAP IN 1000 BTU/hr	8 oz. OIL CAP GPH	16 oz. PRI AIR CFM @ 16 oz.	16 oz. SEC AIR CFM	16 oz. BTU CAP IN 1000 BTU/hr	16 oz. OIL CAP GPH	20 oz. PRI AIR CFM @ 20 oz.	20 oz. SEC AIR CFM	20 oz. BTU CAP IN 1000 BTU/hr	20 oz. OIL CAP GPH	24 oz. PRI AIR CFM @ 24 oz.	24 oz. SEC AIR CFM	24 oz. BTU CAP IN 1000 BTU/hr	24 oz. OIL CAP GPH
	210	7.2	38.4	228	1.65	7.2	54	306	2.21	7.2	72	396	2.86	8.0	81	445	3.22	8.8	89	489	3.54
	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

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 and 30-50 psig upstream of the oil ratio regulator.

4- Natural gas pressure required at the burner is 6" w.c. for capacities listed at 16 oz. air pressure.

5- When firing on gas only, the primary air must be used along with the secondary air and must be set at 4" w.c. minimum.

6- When firing on oil only, the primary air must be set as specified in Table 2.

GAS - MAXIMUM % EXCESS AIR

NMC BURNER NO.	AIR PRESSURE 4 oz	8 oz	16 oz
210	735	1080	748
215	600	600	600
220	600	600	600
230	600	600	600
240	200	300	400
260	400	600	400

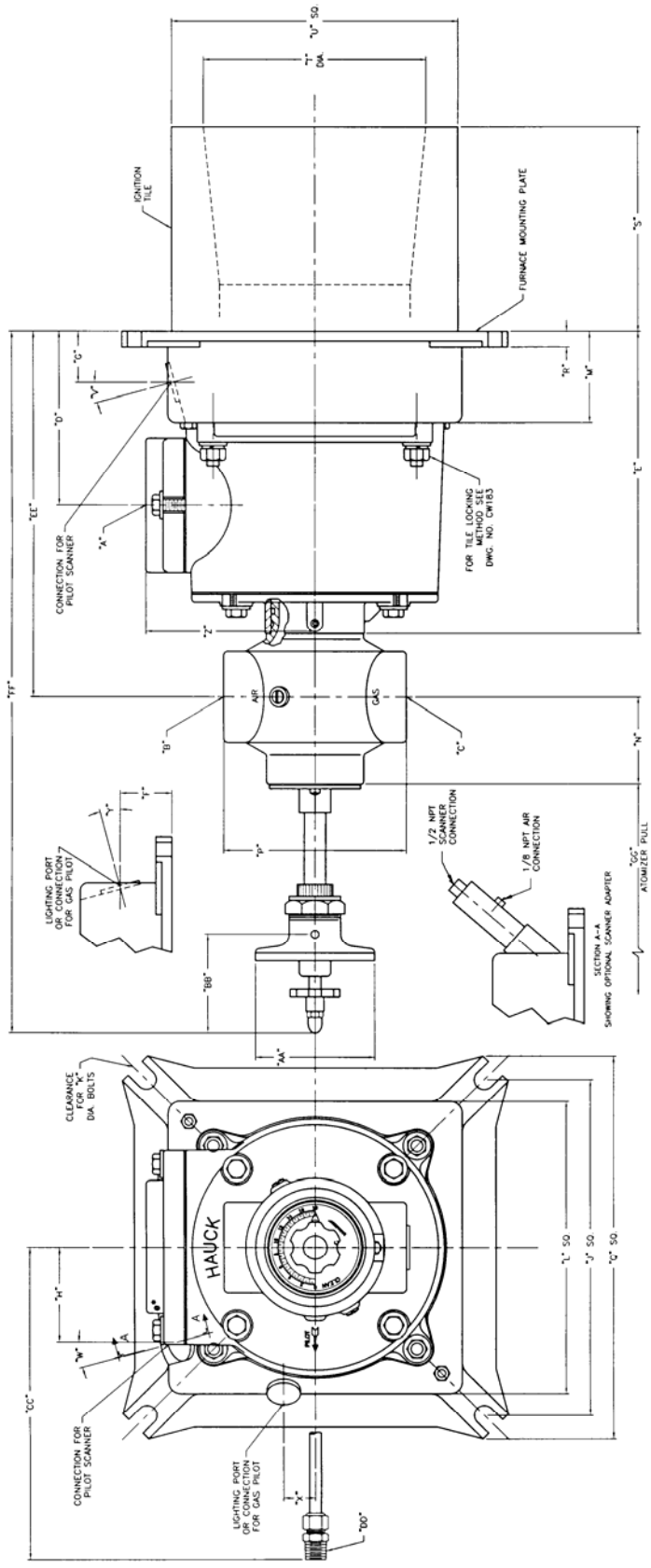
Table 3.

OIL - MAXIMUM % EXCESS AIR

NMC BURNER NO.	AIR PRESSURE 4 oz	8 oz	16 oz
210	180	292	307
215	200	250	350
220	100	170	350
230	100	250	400
240	100	350	400
260	400	500	500

Table 4.

D. DIMENSIONS

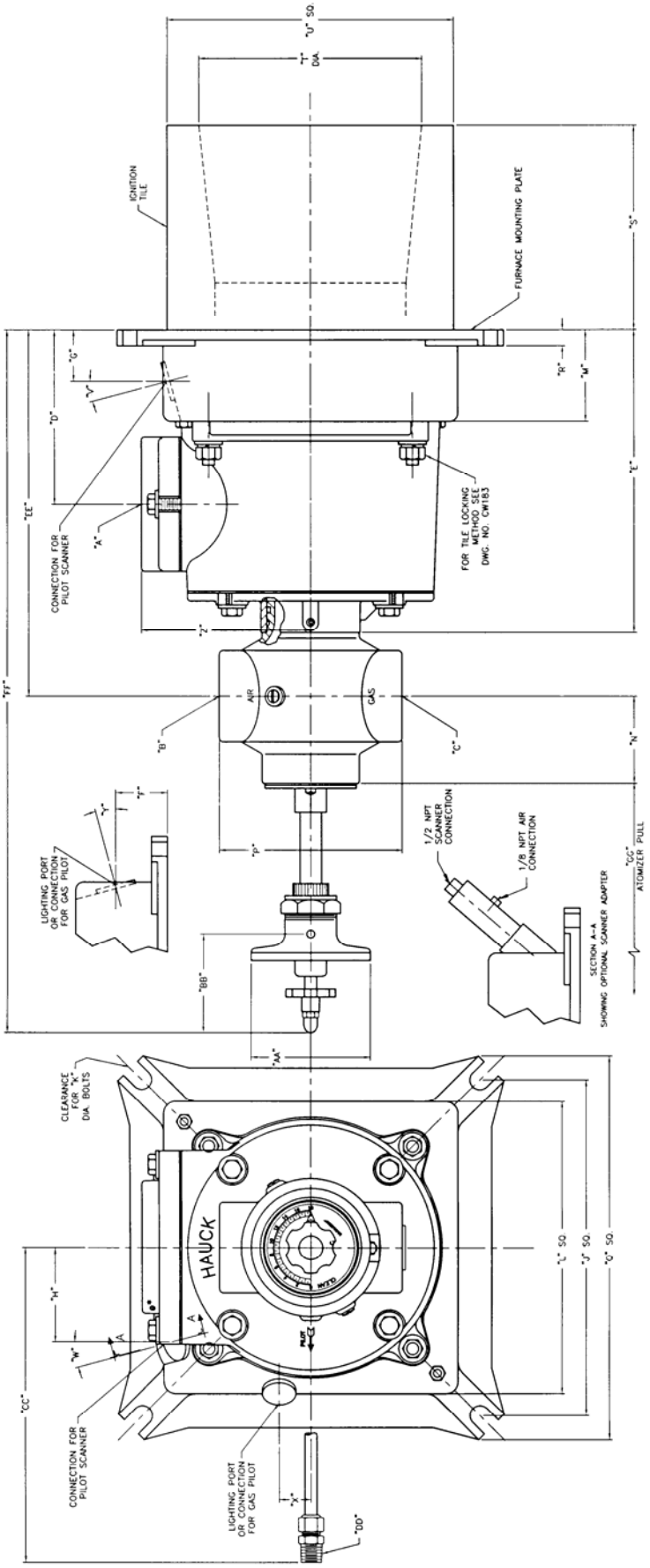


BURNER NO.	AIR INLET NPT	AIR INLET NPT	GAS INLET NPT	DIMENSIONS IN INCHES																											
	"A"	"B"	"C"	"D"	"E"	"F"	"G"	"H"	"J"	"K"	"L"	"M"	"N"	"P"	"Q"	"R"	"S"	"T"	"U"	"V"	"W"	"X"	"Y"	"Z"	"AA"	"BB"	"CC"	"DD"	"EE"	"FF"	"GG"
NMC 2108	1	1	1	4 3/8	7 1/16	1 9/16	1 13/16	1 3/4	7 3/8	3/8	6 3/4	2 3/4	2 3/8	4 3/8	8 5/8	7/16	5	4	6	30°	15°	0	30°	3 1/4	3 1/16	3 1/8	20	3/8	8 5/8	19 1/4	16 7/16
NMC 2158	1 1/2	1	1	4 5/8	7 9/16	1 1/2	2	1 7/8	9	3/8	8 1/4	2 3/4	2 3/8	4 3/8	10 1/4	1/2	5	4 5/16	7 1/2	30°	13°	0	30°	3 1/2	3 1/16	3 1/8	20	3/8	9 3/8	19 7/8	16 1/2
NMC 2208	2	2	2	4 7/8	8 1/8	1 13/16	1 7/8	2 3/4	10 5/8	5/8	9 7/8	2 3/4	2 3/4	5 3/4	12 1/8	1/2	6 1/2	5 1/2	9	40°	15°	0	47°	4 1/8	3 1/16	3 1/8	20	3/8	10 1/8	21 1/8	17 1/16
NMC 2308	3	2	2	5 1/2	9 11/16	1 13/16	1 7/8	2 3/4	10 5/8	5/8	9 7/8	2 3/4	2 3/4	5 3/4	12 1/8	1/2	6 1/2	7	9	40°	15°	0	47°	5 5/16	3 1/16	3 1/8	20	3/8	11 9/16	21 5/16	18 1/16
NMC 2402	4	2 1/2	2 1/2	8 7/8	14 7/16	2 5/16	1 1/4	3 1/4	17 1/4	5/8	16	3 1/16	3 3/16	7 1/16	19 3/4	5/8	11 5/16	9 1/2	14 3/4	39°	0°	1	56°	7 5/8	3 1/16	3 1/8	20	3/8	17	29 13/16	25 1/8

Y2466
(NOT TO SCALE)

* ALL PRESSURE TAPS 1/8" NPT
NO PRESSURE TAP ON AIR INLET FLANGE ON NMG 210, 215 & 220

Figure 1. Dimensions NMC 210 – NMC 240



DIMENSIONS IN MILLIMETERS

BURNER NO.	AIR INLET NPT	AIR INLET NPT	GAS INLET NPT																												
	"X"	"B"	"C"	"D"	"E"	"F"	"G"	"H"	"J"	"K"	"L"	"M"	"N"	"P"	"Q"	"R"	"S"	"T"	"U"	"V"	"W"	"X"	"Y"	"Z"	"AA"	"BB"	"CC"	"DD"	"EE"	"FF"	"GG"
NMC 210B	1	1	1	111	179	40	46	44	187	10	171	70	60	111	219	11	127	102	152	30°	15°	0	30°	83	78	79	508	3/8	219	489	418
NMC 215B	1 1/2	1	1	117	192	38	51	48	229	10	210	70	60	111	260	13	127	110	191	30°	13°	0	30°	89	78	79	508	3/8	238	505	419
NMC 220B	2	2	2	124	206	46	48	70	270	16	251	70	70	146	308	13	165	140	229	40°	15°	0	47°	105	78	79	508	3/8	257	537	433
NMC 230B	3	2	2	140	246	46	48	70	270	16	251	70	70	146	308	13	165	178	229	40°	15°	0	47°	135	78	79	508	3/8	294	541	459
NMC 240C	4	2 1/2	2 1/2	225	367	59	32	83	438	16	406	78	81	179	502	16	287	241	375	39°	0°	1	56°	194	78	79	508	3/8	432	757	638

* ALL PRESSURE TAPS 1/8" NPT
NO PRESSURE TAP ON AIR INLET FLANGE ON NMG 210, 215 & 220

Y2466 METRIC
(NOT TO SCALE)

Figure 2. Metric Dimensions NMC 210 – NMC 240

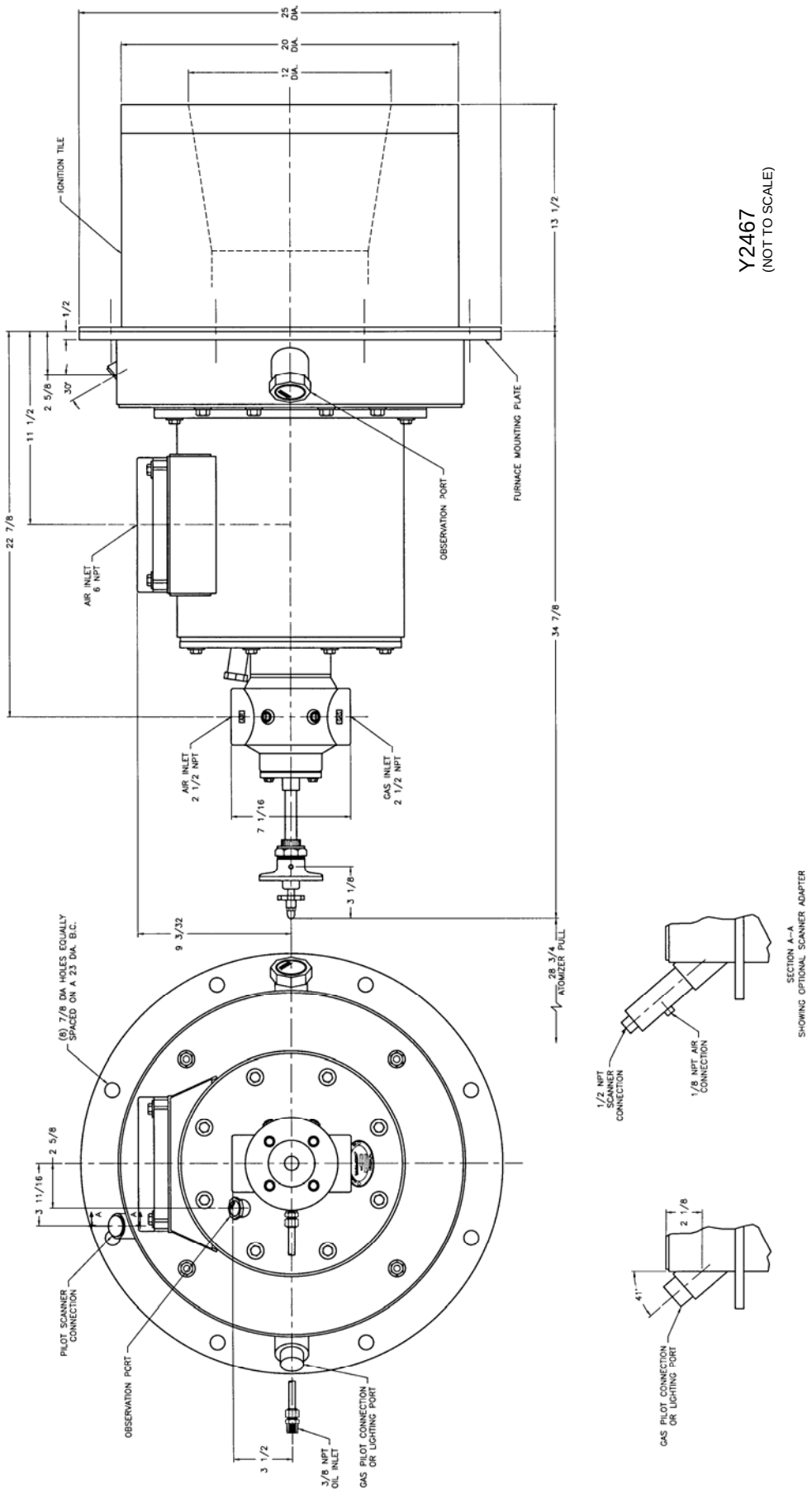


Figure 3. Dimensions NMC 260

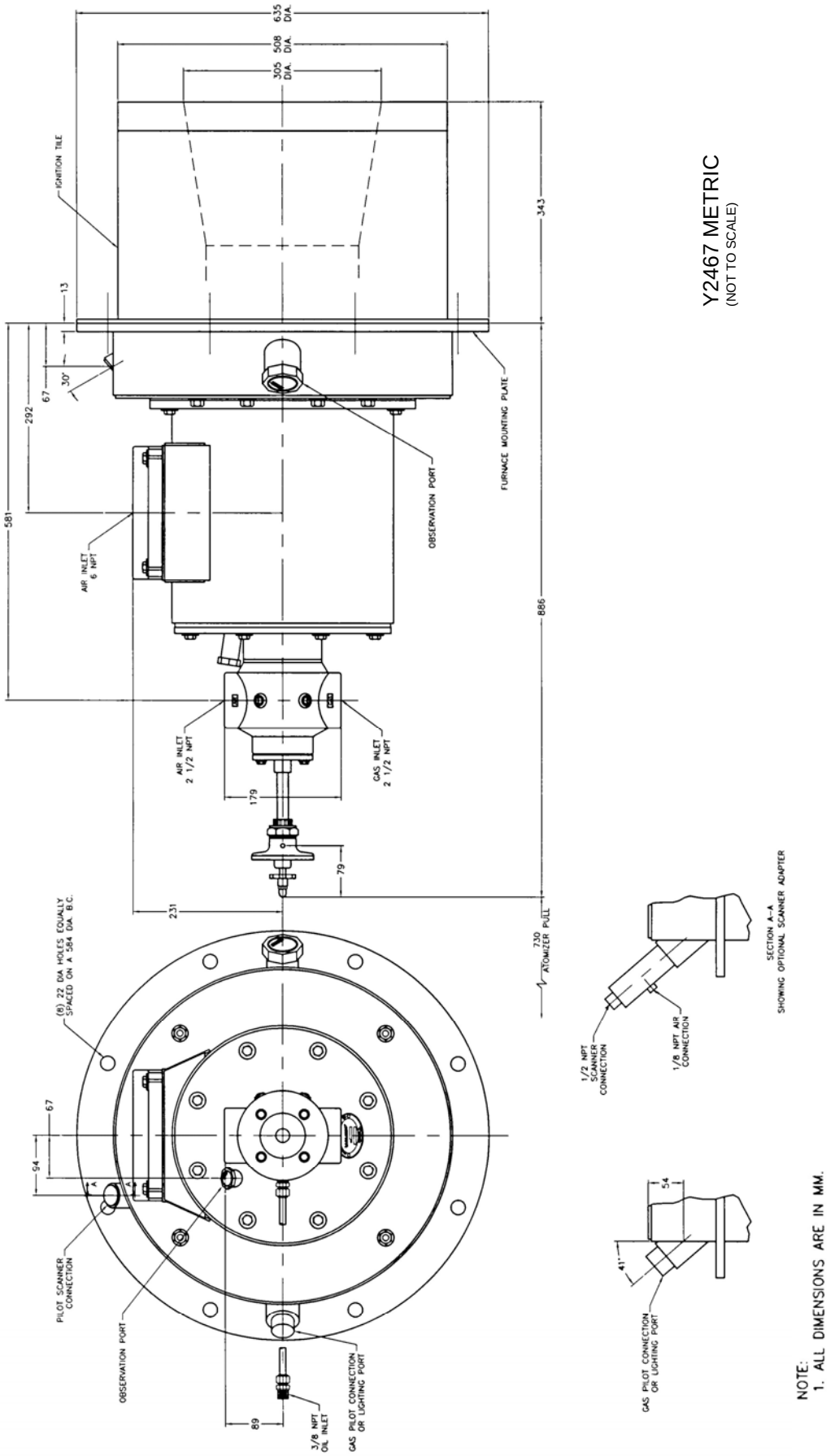


Figure 4. Metric Dimensions NMC 260

F. 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 mounting plate.

5. For soft wall installations at temperature less than 1600°F, the tile should be encased in a stainless steel shell. For higher temperatures, provisions should be made to support the tile independent of the soft wall.

6. Tile extensions between the end of the burner tile and the inside surface of the wall should be provided at the nominal O.D. dimensions of the burner tile.

7. Bolt the mounting plate to the furnace wall.

8. Ensure that a complete seal exists between the mounting assembly, the tile and the furnace wall.

> **IMPORTANT**
> 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.

9. 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 one of either 4 (burners 210 through 240) or 8 (burners 260) additional positions.
   If a flame scanner is used, when rotating the burner, be sure to always place the scanner such that dirt can not fall back into the scanner viewing port. In addition, a scanner purge air connector (1/8" copper pipe) should always be used to prevent soot build-up during firing.

IMPORTANT

NMC210-230 Burners only – If the pilot and secondary air are to be in line, a 45° No. 1 spark ignited gas pilot must be used to avoid interference. Also, NMC220-230 Burners only – If the pilot and secondary air are to be in line, special consideration should be given to the method of installing the secondary line piping. It will be necessary to remove or disconnect the secondary air piping from the burner to facilitate removal and reinstallation of the pilot.

To rotate the secondary air 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 unless the pilot is in line with or 180° from the secondary air line. In that case the word "pilot" should be 90° from the actual pilot location.
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.

10. 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 setscrew 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 setscrew.

11. NMC burner No. 260 ONLY. All other burner sizes proceed to step 12.
    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.

12. 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.

13. 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 are normally equipped with a slip-fit cap and a setscrew. If the furnace back pressure exceeds 1" wc, threaded ports are mandatory on all burners. For proper installation, consult the instructions which accompany the pilot and detection system chosen.

G. 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 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. (Alternately, if a 9 o'clock secondary air position is required and it is desired to use the standard No. 1 pilot, the mounting plate may be rotated so as to position the pilot at either the 12 o'clock or 3 o'clock position).

Burners intended for preheated air operation are identified by the letter "H" immediately preceeding 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.

H. 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.