



CAPACITIES

NMC NOZZLE MIX BURNERS COMBINATION FUEL FIRED AMBIENT AIR MODELS

O N R A T I O G A S	NMC BURNERS 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	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.

O N R A T I O I 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	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.

In accordance with Hauck's commitment to Total Quality Improvement, Hauck reserves the right to change the specifications of products without prior notice.

PREHEATED AIR MODELS

(Air Flow @ 16 osig)

NMC BURNER NO.	ITEM	SECONDARY AIR TEMP., °F				EXCESS AIR, %	
		100	400	650	800	GAS	OIL
H210	Primary air, scfm (cold)	7.2	7.2	7.2	7.2	200	30
	Secondary air, scfm	72	58	51	48		
	Natural gas capacity, scfh	392	316	278	261		
	Oil Capacity, gph @ 20% excess air	2.6	2.1	1.8	1.7		
H215	Primary air, scfm	14.3	14.3	14.3	14.3	200	100
	Secondary air, scfm	140	113	99	93		
	Natural gas capacity, scfh	854	645	570	537		
	Oil Capacity, gph	5.7	4.7	4.2	4.0		
H220	Primary air, scfm	28.3	28.3	28.3	28.3	200	100
	Secondary air, scfm	263	212	187	175		
	Natural gas capacity, scfh	1614	1214	1074	1010		
	Oil Capacity, gph	10.7	8.9	7.9	7.5		
H230	Primary air, scfm	57	57	57	57	200	150
	Secondary air, scfm	544	439	386	363		
	Natural gas capacity, scfh	3330	2510	2219	2088		
	Oil Capacity, gph	22.2	18.3	16.3	15.5		
H240	Primary air, scfm	76	76	76	76	150	150
	Secondary air, scfm	825	666	586	550		
	Natural gas capacity, scfh	4992	3793	3352	3152		
	Oil Capacity, gph	33.2	27.3	24.4	23.1		
H260	Primary air, scfm	148	148	148	148	150	200
	Secondary air, scfm	1560	1259	1108	1040		
	Natural gas capacity, scfh	9463	7178	6343	5966		
	Oil Capacity, gph	63.0	51.9	46.3	43.8		

CAPACITY TABLE AND APPLICATION NOTES

- Fuel capacity based on light oil at 138,000 Btu/gal and natural gas at 1040 Btu/cu ft.
- Natural gas flows shown for 10% excess air, 6"wc inlet pressure. Oil flow capacities computed for 20% excess air.
- Primary air scfm shown at 16 osig pressure for oil atomization on all model. Set primary air at 1 osig when firing models H210 through H260 on gas.
- Primary air flow stated at ambient temperature at 16 osig. Do not heat primary air.
- Combustion air capacities at 16 osi total pressure. Air flows at lower pressures proportional to $\sqrt{P/16}$. Air flows at intermediate temperatures proportional to $\sqrt{\frac{860}{T_h+460}}$ times the flow at 400°F.
- Include sensible heat of preheated air when computing total burner heat output. Sensible heat Btu/hr = scfm x 1.11 x ΔT(°F).
- Maximum % excess air limits (approximate) shown for 16 osig secondary air pressure.
- Turndown on gas approx. 8:1 at 400°F, 7:1 at 800°F; turndown on oil approx. 4:1.
- To size pipe for preheated air, compute acfm = scfm $\left(\frac{T+460}{520}\right)$.
- When supervising flame, provide approximately 16 osig ambient purge air (1-1/2 – 2 cfm) to standard scanner purge assembly.
- Flame lengths are shown in Hauck Application Sheet GJ58.
- When sizing blower, consider application and operation so as to prevent overloading the blower motor at ambient scfm.

ALL MODELS:

See burner selection data, Hauck sheet NMC-4, Supplemental Data

BURNER SELECTION

The capacities shown in Hauck sheet NMC-2 should be used when selecting the burner size required for applications demanding maximum Btu release. The Btu capacities are based on 10% excess air (slightly oxidizing condition for optimum performance). The turndown requirement may affect the burner selection in that a higher air pressure generally affords a greater turndown. The limits of turndown are also affected by the limits of the control system. With a ratio control system, a turndown range of 10:1 on gas and 5:1 in oil is normal. Under favorable conditions and depending on application environment, an even wider range of turndown is possible. The NMC burner can be used on applications where firing on "excess fuel" is required (up to 25% for oil and 100% for gas). Applications of this type require that the burner be fired into a chamber in which sufficient oxygen exists to complete combustion.

CONSTANT EXCESS AIR SYSTEM

In this system, the air-gas ratio is held constant as the Btu/hr is varied. The temperature of the products of combustion entering the furnace remain constant.

BURNER SELECTION. To select a burner using a constant excess air system, proceed as follows:

1. Determine the % of excess air, using Figure 3, required for the desired temperature of the products of combustion.
2. Determine the Btu requirement of burner.
3. Calculate the air requirements of the burner using the following formula:

$$\frac{\text{BTU} \times (\% \text{ excess air} + 100)}{600,000} = \text{CFM air through burner}$$
4. Select a burner from Table 1 which has the air capacities calculated in step 3.
5. Determine the excess air ability of the selected burner using Table 3 or Table 4. If the excess air ability is insufficient or greatly exceeded, select the next larger or smaller burner, as required.

VARIABLE EXCESS AIR SYSTEM

In this system the burner is selected for its "on ratio" capacity, turndown is obtained by keeping the air fully on and reducing only the fuel input.

BURNER SELECTION. To select a burner using a variable excess air system, proceed as follows:

1. Determine the required minimum and maximum Btu/hr input and minimum temperature of the products of combustion.
2. Select, from Table 1, the burner size and air pressure necessary to satisfy the maximum Btu/hr requirement.
3. Determine the excess air ability of the selected burner using Table 3 or Table 4.
4. Calculate the minimum Btu/hr rating of the selected burner using the following formula:

$$\text{Minimum Btu/hr} = \frac{\text{Air CFM rating of burner} \times 600,000}{\% \text{ excess air rating of burner} + 100}$$
5. Determine the minimum temperature of the products of combustion from Figure 3. If either the minimum capacity or minimum temperature is less than required, the burner selection is correct. If not, repeat the process with a larger or smaller burner as required.

EFFECTS OF EXCESS AIR

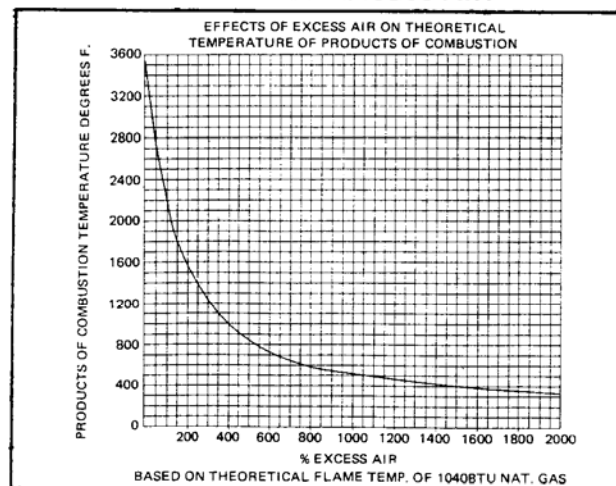


Fig. 3 – Chart No. GY834

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.

NM NOZZLE MIX BURNERS FLAME LENGTHS

This sheet provides approximate flame length and diameter for Hauck NM Nozzle Mix Burners. These guidelines are furnished to aid in the proper selection of a NM burner for a specific furnace application.

Flame length will vary depending upon actual operating conditions. A *shorter* flame can be expected with higher temperature furnace and a faster burning gas. A *longer* flame can be expected with less excess air in the furnace, slower burning gas, and very high draft (parallel flow).

<u>Size</u>	<u>Fuel</u>	<u>Capacity Btu/hr</u>	<u>Flame Length</u>	<u>Flame Diameter</u>
NM210	Oil	371,000	1.5 Ft	6"
NM210	Gas	365,000	1.5 Ft	6"
NM215	Oil	722,000	3.0 Ft	7"
NM215	Gas	764,000	3.0 Ft	6"
NM220	Oil	1,458,000	3.5 Ft	10"
NM220	Gas	1,435,000	3.5 Ft	9"
NM230	Oil	3,005,000	5.0 Ft	12"
NM230	Gas	2,968,000	4.5 Ft	12"
NM240	Oil	4,505,000	6.5 Ft	15"
NM240	Gas	4,500,000	5.5 Ft	14"
NMC260	Oil	8,540,000	9.5 Ft	21"
NMC260	Gas	8,510,000	7.5 Ft	18"
NMG260	Gas	8,510,000	9.0 Ft	26"

NOTE

Combustion air capacities at 16 osi total pressure
 Gas capacity based on 10% excess air
 Oil capacity based on 20% excess air

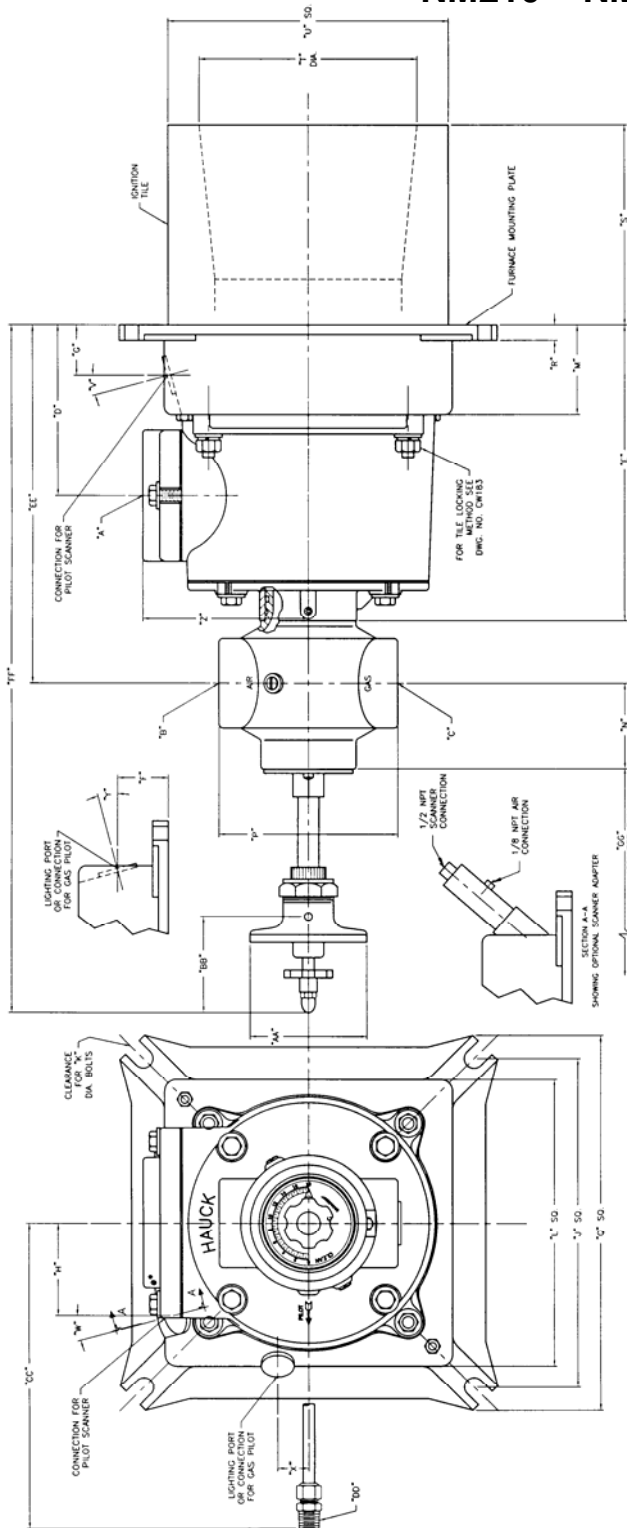
Flame lengths measured at stoichiometric burner operation
 Flame length (estimate) at 24 osig; add 20%
 Flame length (estimate) at 8 osig; subtract 15%

Flame lengths were measured in Hauck's laboratory furnace using natural gas, No. 2 oil and room air in a cold (ambient temperature) furnace and medium draft conditions (0-.2" wc). Excess air was available in the furnace although burner ratio conditions were as stated above.



DIMENSIONS

NMC NOZZLE MIX BURNERS COMBINATION FUEL FIRED NM210 – NM240



BURNER NO.	AIR INLET NPT		AIR INLET NPT		GAS INLET NPT		DIMENSIONS IN INCHES																									
	"A"	"B"	"C"	"D"	"E"	"F"	"G"	"H"	"I"	"J"	"K"	"L"	"M"	"N"	"O"	"P"	"Q"	"R"	"S"	"T"	"U"	"V"	"W"	"X"	"Y"	"Z"	"AA"	"AB"	"AC"	"AD"	"AE"	"AF"
NMC 210B	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 1/2	3 1/16	3 1/8	20	3/8	8 5/8	19 1/4	16 7/16
NMC 215B	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	15	0	30	3 1/2	3 1/16	3 1/8	20	3/8	9 3/8	19 7/8	16 1/2	
NMC 220B	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 230B	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 240C	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 5/16	7 1/16	19 3/4	5/8	11 5/16	9 1/2	14 3/4	30	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)

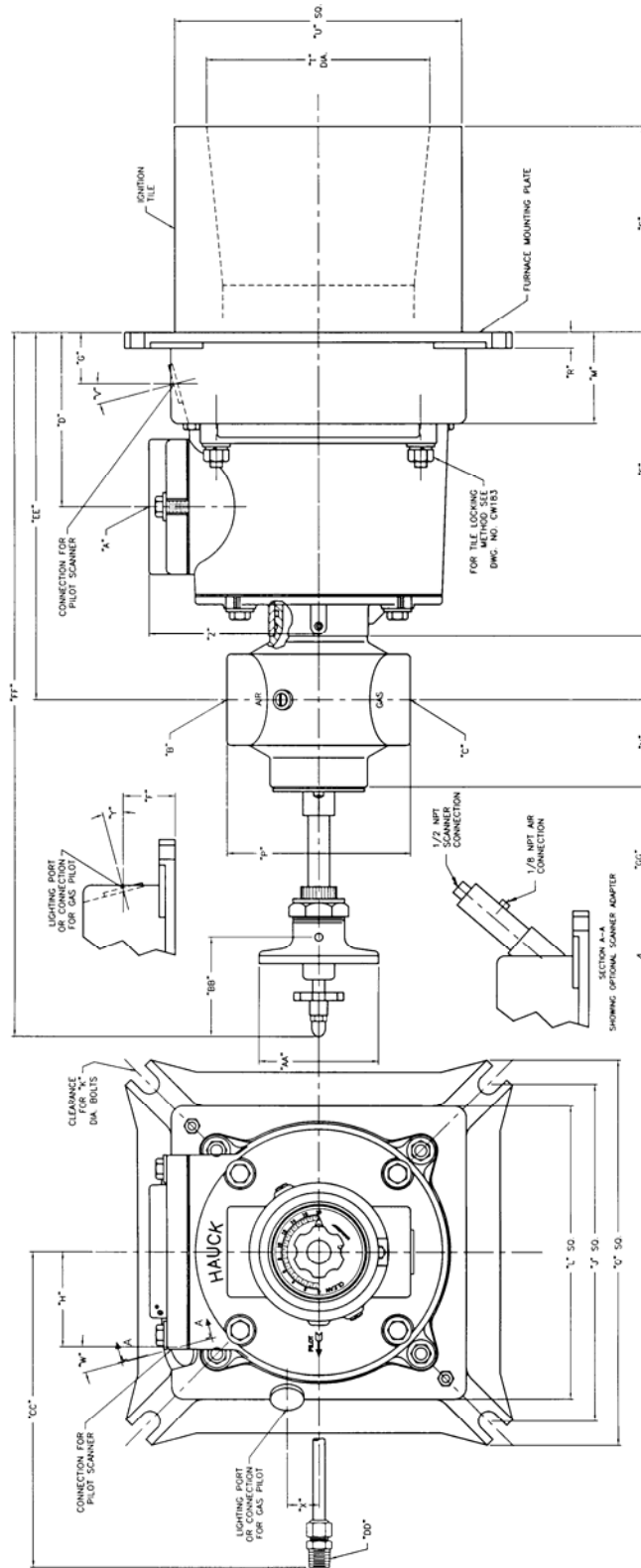
* ALL PRESSURE TAPS 1/8" NPT
NO PRESSURE TAP ON AIR INLET FLANGE ON NMC 210, 215 & 220

(See Reverse Side For Metric Dimensions)

In accordance with Hauck's commitment to Total Quality Improvement, Hauck reserves the right to change the specifications of products without prior notice.

METRIC DIMENSIONS

NMC NOZZLE MIX BURNERS COMBINATION FUEL FIRED NM210 – NM240



BURNER NO	AIR INLET NPT		GAS INLET NPT		DIMENSIONS IN MILLIMETERS																												
	"A"	"B"	"C"	"D"	"E"	"F"	"G"	"H"	"I"	"J"	"K"	"L"	"M"	"N"	"O"	"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	307	157	307	157	0	307	83	78	79	508	378	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	307	137	307	137	0	307	89	78	79	508	378	238	505	419
NMC 220B	2	2	2	124	206	46	48	70	270	16	251	70	70	146	308	13	165	140	229	407	157	407	157	0	477	105	78	79	508	378	297	537	433
NMC 230B	3	2	2	140	246	46	48	70	270	16	251	70	70	146	308	13	165	178	229	407	157	407	157	0	477	135	78	79	508	378	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	397	0	397	0	1	567	194	78	79	508	378	432	757	638

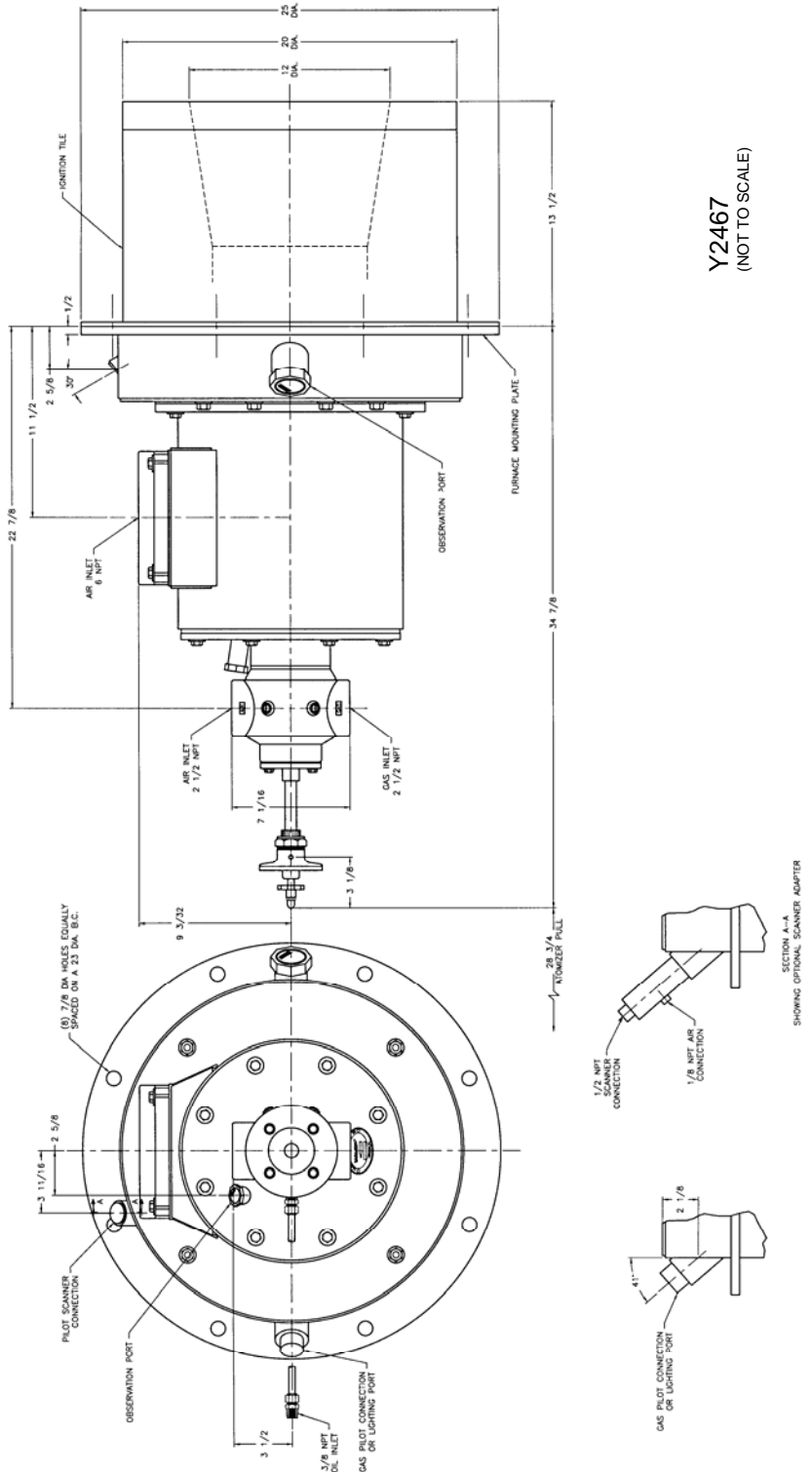
Y2466 METRIC
(NOT TO SCALE)

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



DIMENSIONS

NMC NOZZLE MIX BURNERS COMBINATION FUEL FIRED NMC260

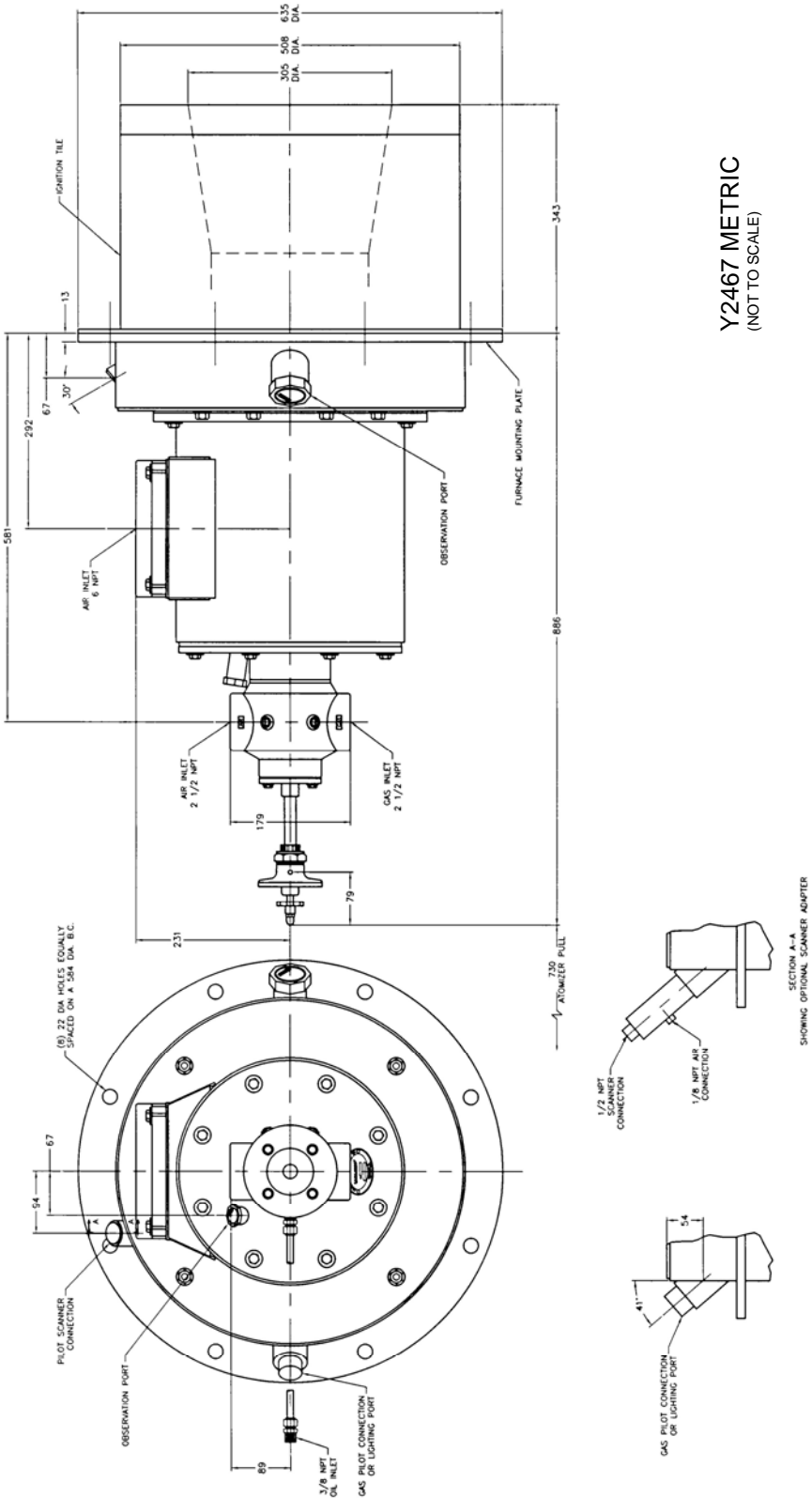


In accordance with Hauck's commitment to Total Quality Improvement, Hauck reserves the right to change the specifications of products without prior notice.

(See Reverse Side For Metric Dimensions)

METRIC DIMENSIONS

NMC NOZZLE MIX BURNERS COMBINATION FUEL FIRED NMC260



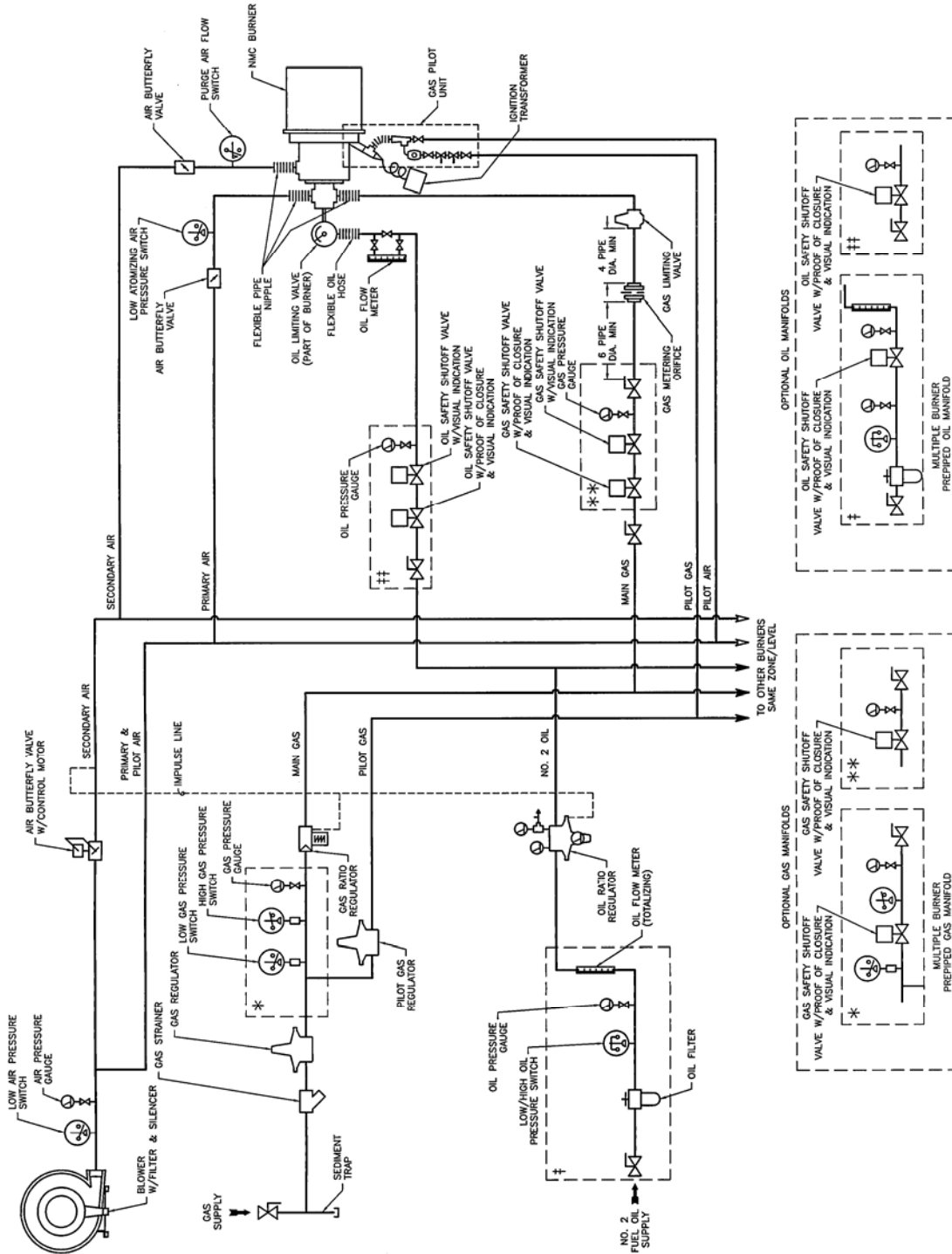
Y2467 METRIC
(NOT TO SCALE)

NOTE:
1. ALL DIMENSIONS ARE IN MM.



NMC NOZZLE MIX BURNERS COMBINATION FUEL FIRED

TYPICAL MULTIPLE BURNER SYSTEM RATIO CONTROL



- NOTES:
- OIL RATIO REGULATOR OUTLET CAN NOT BE LOCATED MORE THAN 6" (152MM) LOWER AND NEVER HIGHER THAN THE CENTER LINE OF THE BURNER OIL VALVE FOR HORIZONTALLY MOUNTED BURNERS. OIL RATIO REGULATOR MUST BE MOUNTED WITHIN 20' (6M) OF LESS OF THE OIL BURNERS. IF BURNERS IN THE ZONE ARE MOUNTED AT DIFFERENT ELEVATIONS, ADDITIONAL OIL RATIO REGULATORS ARE REQUIRED (CONSULT HAUCK).
 - OPTIONAL GAS MANIFOLDS CAN BE UTILIZED FOR MULTIPLE BURNERS FIRING INTO A COMMON HEATING CHAMBER, HOWEVER, SPECIAL FEATURES ARE REQUIRED IN THE ASSOCIATED CONTROL SYSTEM (SEE HAUCK APPLICATION SHEET GJ76).

Y6925
(NOT TO SCALE)

In accordance with Hauck's commitment to Total Quality Improvement, Hauck reserves the right to change the specifications of products without prior notice.

This page left intentionally blank.