TriOx

Triple Air Staged Ultra Low NOx Burner

TriOx-1
Edition 09-08

Hauck, a product brand of the Elster Group

- Ultra low NOx emissions of 20 ppm or less
- Invisiflame® mode offers positive UV flame supervision throughout entire operating range for excellent flame safety
- Designed for low excess air operation (5%) for maximum fuel efficiency
- Cold or preheated air up to 900°F (480°C) with higher preheat versions available - consult Hauck
- Direct spark or pilot ignition
- 10:1 on ratio turndown
- Low CO emissions including on cold start

www.hauckburner.com

elster Hauck

Hauck's TriOx burner is ideally suited for aluminum furnaces, steel reheat furnaces, thermal fluid heaters, and other high temperature heat processes requiring ultra low NOx emissions. The burner's three-staged air injection maximizes production efficiency while minimizing NOx and CO emissions. Low excess air operation (5%) results in outstanding fuel efficiency. The TriOx fires any clean industrial fuel gas with a higher heating value of 500 Btu per cubic foot (19.7 MJ/nm^3) or greater with ambient or preheated combustion air.

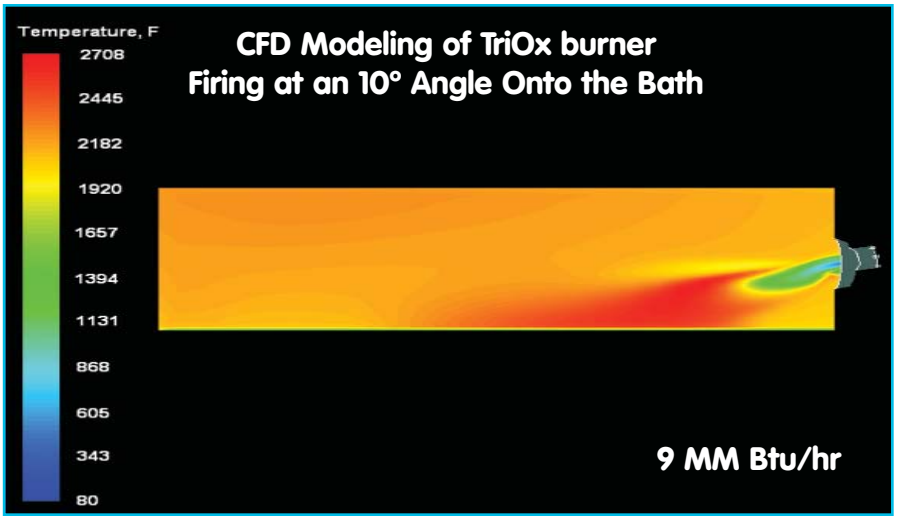
The TriOx burner is ideally suited for industrial heat processes in excess of 1600°F (870°C) requiring ultra low NOx emissions of 20 ppm or less. The burner's 8"w.c. (1990 Pa) air pressure design makes it well-suited for preheated air applications. Consult Hauck for special versions capable of firing preheated air greater than 900°F (480°C).

Capacities range from 3 to more than 21 MM Btu/hr (880 to 6155 kW). Nominal burner air supply pressure is 8"w.c. (1990 Pa). Nominal gas supply pressure required is 12"w.c. (2990 Pa) or less. Consult Hauck for mounting options and field installation recommendations.

In addition to its operating efficiency, the TriOx offers excellent flame safety. When operating in the Invisiflame® mode, the burner still produces a visible, scannable pilot flame. UV flame supervision is available on all burners.

The TriOx features a single air connection and a single low pressure gas connection.

The burner design and performance characteristics were optimized using FLUENT® computational fluid dynamics (CFD) software.



For additional information on this product, visit our website at:

www.hauckburner.com

Hauck Manufacturing Company
POB 90
Lebanon, PA 17042

T +1 717-272-3051
F +1 717-273-9882
info@hauckburner.com

Hauck, a product brand of the Elster Group

TriOx
TRIPLE AIR STAGED ULTRA LOW NOx BURNER

		BURNER MODEL							
		1006		2006		1008		2008	
BURNER SPECIFICATIONS – HIGH FIRE		**BURNER STATIC INLET AIR PRESSURE OF 8"WC**							
Combustion Air Temp.	(°F)	60		900		60		900	
Operating Mode		60/40	90/10	60/40	90/10	60/40	90/10	60/40	90/10
Max. Input @ 5% Excess Air	**(MMBtu/hr)**	**3.2**	**3.0**	**2.0**	**1.9**	**6.1**	**5.5**	**3.9**	**3.4**
Max. Air Flow @ 8"wc	(scfh)	31,800	29,300	19,700	18,100	60,000	53,900	38,400	33,200
Min. Input @ Max. Air Flow	(Btu/hr)	190,000	190,000			250,000	250,000		
Max. Excess Air	(%)	1,680	1,530			2,450	2,180		
Air Press. @ Switching Valve	("wc)	11.7	10.1	11.7	10.9	8.4	9.9	9	10.1
Burner Gas Inlet Press.	("wc)	15.8	13.9	7.9	7.4	7	5.2	3.7	3
Flame Length @ Max. Input	(ft)	8.5	N/A	8.5	N/A	12	N/A	10	N/A
Flame Dia. @ Max. Input	(ft)	3	N/A	3	N/A	2.5	N/A	2.5	N/A
Stage 1 & 2 Air Static Press.	("wc)	8	0.3	8	0.3	8	0.5	8	0.4
Stage 3 Air Static Press.	("wc)	4.4	8	3.9	8	6.4	8	6	8
BURNER SPECIFICATIONS – LOW FIRE									
Input @ 5% Excess Air	(Btu/hr)	407,000	407,000			730,000	730,000		
Air Flow	(scfh)	4,030	4,030			7,250	7,250		
Min Input @ Air flow	(Btu/hr)	70,000	70,000			175,000	175,000		
Max. Excess Air	(%)	510	510			340	340		
Min Gas for Ignition	(scfh)	70	70			170	250		
Min Gas for UV Signal	(scfh)	70	70			170	250		

Notes:

1. Operating Mode is approximate percentage of Stage 3 Air to Stage 1 & 2 Air through the burner body.
2. 60/40 operating mode is required for furnace temperatures below 1600°F; 90/10 (termed Invisiflame™) operating mode is suitable for furnace temperatures above 1600°F.
3. Capacities based on natural gas with HHV of 1034 Btu/ft^3, 0.59 S.G., and stoichiometric air:gas ratio of 9.74:1 with burner firing into chamber under no pressure @ 5% excess air.
4. Air and gas flows based on 60°F @ sea level.
5. Static air pressure measured at designated locations.
6. Flame lengths measured from the end of the burner tile.
7. Flame length and diameter is not applicable in Invisiflame™ operating mode.
8. All data based on industry standard air and gas piping practices.
9. Flame detection via UV scanner.
10. Burners can be operated up to a static inlet air pressure of 8 osig; consult Hauck.

(Metric Capacities on Reverse Side)

TriOx
TRIPLE AIR STAGED ULTRA LOW NOx BURNER

		BURNER MODEL							
		1012		2012		1014		2014	
BURNER SPECIFICATIONS – HIGH FIRE		**BURNER STATIC INLET AIR PRESSURE OF 8"WC**							
Combustion Air Temp.	(°F)	60		900		60		900	
Operating Mode		60/40	90/10	60/40	90/10	60/40	90/10	60/40	90/10
Max. Input @ 5% Excess Air	**(MMBtu/hr)**	**11.3**	**10.9**	**7**	**6.8**	**15.9**	**15.1**	**9.8**	**9.3**
Max. Air Flow @ 8"wc	(scfh)	112,000	108,000	69,300	66,800	157,000	149,000	97,200	92,300
Min. Input @ Max. Air Flow	(Btu/hr)	500,000	500,000			500,000	500,000		
Max. Excess Air	(%)	2,280	2,190			3,240	3,070		
Air Press. @ Switching Valve	("wc)	8.6	9.3	9	10.2	8.2	8.3	8.8	9.1
Burner Gas Inlet Press.	("wc)	12	12	5	4.4	14.7	13.5	6	5.3
Flame Length @ Max. Input	(ft)	16	N/A	13	N/A	15	N/A	12.5	N/A
Flame Dia. @ Max. Input	(ft)	4.5	N/A	3.5	N/A	5.5	N/A	4.5	N/A
Stage 1 & 2 Air Static Press.	("wc)	8	0.3	8	0.3	8	0.2	8	0.2
Stage 3 Air Static Press.	("wc)	6.2	8	6.2	8	5.5	8	5.5	8
BURNER SPECIFICATIONS – LOW FIRE									
Input @ 5% Excess Air	(MMBtu/hr))	1.6	1.5			2	2		
Air Flow	(scfh)	15,700	14,600			19,800	19,800		
Min. Input @ Air Flow	(Btu/hr)	207,000	207,000			415,000	415,000		
Max. Excess Air	(%)	700	650			380	380		
Min Gas for Ignition	(scfh)	200	390			400	400		
Min Gas for UV Signal	(scfh)	200	390			350	350		

Notes:

1. Operating Mode is approximate percentage of Stage 3 Air to Stage 1 & 2 Air through the burner body.
2. 60/40 operating mode is required for furnace temperatures below 1600°F; 90/10 (termed Invisiflame™) operating mode is suitable for furnace temperatures above 1600°F.
3. Capacities based on natural gas with HHV of 1034 Btu/ft^3, 0.59 S.G., and stoichiometric air:gas ratio of 9.74:1 with burner firing into chamber under no pressure @ 5% excess air.
4. Air and gas flows based on 60°F @ sea level.
5. Static air pressure measured at designated locations.
6. Flame lengths measured from the end of the burner tile.
7. Flame length and diameter is not applicable in Invisiflame™ operating mode.
8. All data based on industry standard air and gas piping practices.
9. Flame detection via UV scanner.
10. Burners can be operated up to a static inlet air pressure of 8 osig; consult Hauck.

(Metric Capacities on Reverse Side)

TriOx

TRIPLE AIR STAGED ULTRA LOW NOx BURNER

		BURNER MODEL			
		1016		2016	
BURNER SPECIFICATIONS – HIGH FIRE		**BURNER STATIC INLET AIR PRESSURE OF 8"WC**			
Combustion Air Temp.	(°F)	60		900	
Operating Mode		60/40	90/10	60/40	90/10
Max. Input @ 5% Excess Air	**(MMBtu/hr)**	**21**	**21**	**13**	**13**
Max. Air Flow @ 8"wc	(scfh)	207,000	207,000	128,000	128,000
Min. Input @ Max Air Flow	(Btu/hr)	900,000	900,000		
Max. Excess Air	(%)	2,340	2,340		
Air Press. @ Switching Valve	("wc)	8.2	9.7	8.8	10.5
Burner Gas Inlet Press.	("wc)	8.1	7.2	4	3.1
Flame Length @ Max. Input	(ft)	18	N/A	15	N/A
Flame Dia. @ Max. Input	(ft)	6	N/A	5	N/A
Stage 1 & 2 Air Static Press.	("wc)	8	0.1	8	0.1
Stage 3 Air Static Press.	("wc)	5	8	5	8
BURNER SPECIFICATIONS – LOW FIRE					
Input @ 5% Excess Air	(MMBtu/hr)	2.5	2.5		
Air Flow	(scfh)	24,700	24,700		
Min. Input @ Air Flow	(Btu/hr)	800,000	800,000		
Max. Excess Air	(%)	230	230		
Min Gas for Ignition	(scfh)	775	775		
Min Gas for UV Signal	(scfh)	775	775		

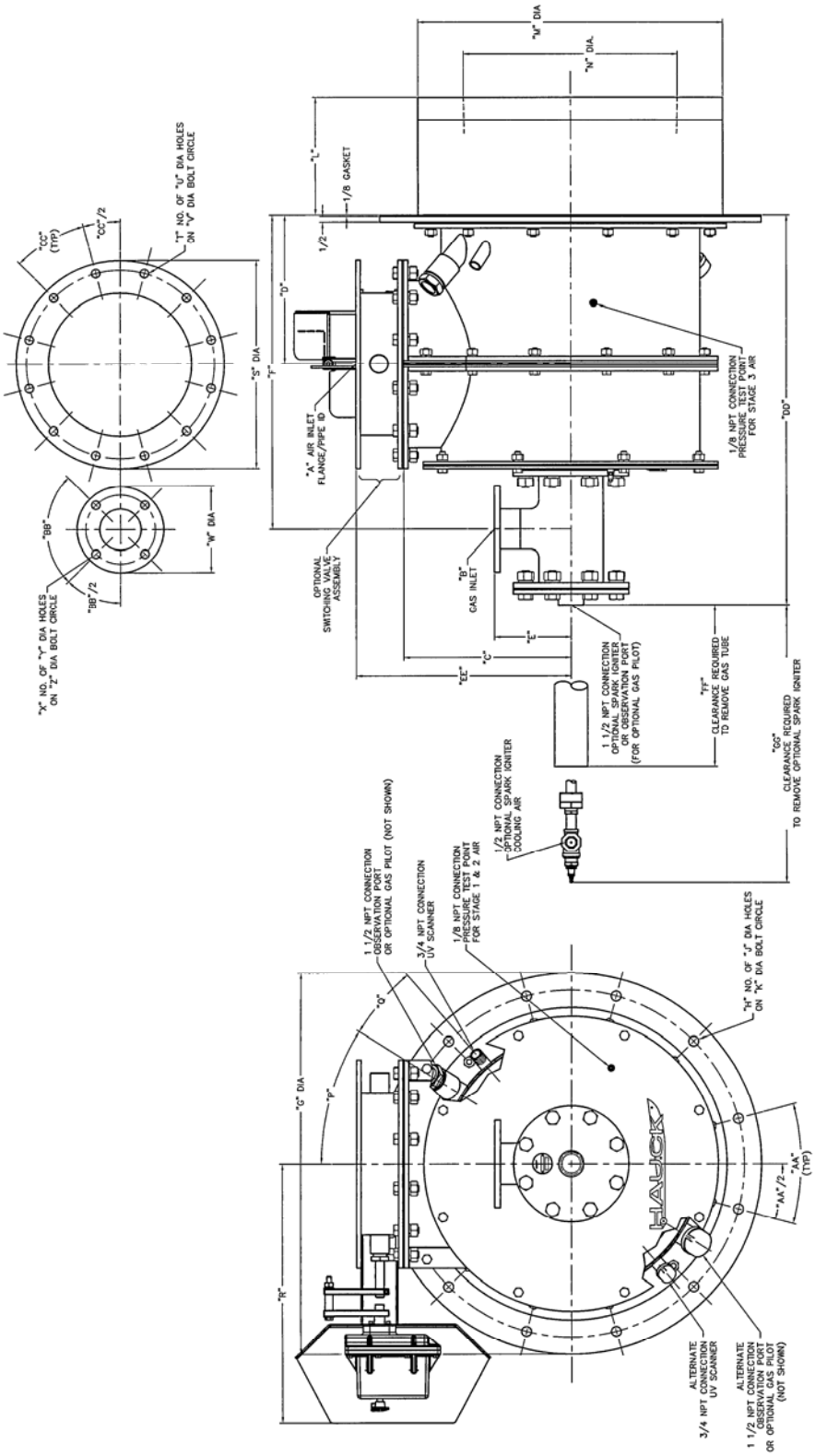
Notes:

1. Operating Mode is approximate percentage of Stage 3 Air to Stage 1 & 2 Air through the burner body.
2. 60/40 operating mode is required for furnace temperatures below 1600°F; 90/10 (termed Invisiflame™) operating mode is suitable for furnace temperatures above 1600°F.
3. Capacities based on natural gas with HHV of 1034 Btu/ft^3, 0.59 S.G., and stoichiometric air:gas ratio of 9.74:1 with burner firing into chamber under no pressure @ 5% excess air.
4. Air and Gas flows based on 60°F @ sea level.
5. Static air pressure measured at designated locations.
6. Flame lengths measured from the end of the burner tile.
7. Flame length and diameter is not applicable in Invisiflame™ operating mode.
8. All data based on industry standard air and gas piping practices.
9. Flame detection via UV scanner.
10. Burners can be operated up to a static inlet air pressure of 8 osig; consult Hauck.

(Metric Capacities on Reverse Side)

TriOx
TRIPLE AIR STAGED ULTRA LOW NOx BURNER

TriOx 1006 – TriOx 2016



MODEL NO.	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	APPROX. NET WT.
TRIOX 1006–2006	6" ID	2" NPT	13	10 17/32	2 15/16	23 1/4	23	12	7/8	21	6	17 7/8	13 7/8	32°	22°	19 3/16	11	8	19/32	10	---	---	---	---	30°	---	45°	26 5/16	17 1/8	21	37	470 LB
TRIOX 1008–2008	8" RPM	2 1/2" FLG	13 3/16	12 29/32	5 1/2	26 1/2	30 1/2			27 1/2	7 11/16	23 7/8	16	38°	16°	20 1/2	14	12		12 1/4	7	---	---	5 1/2		90°	30°	32 5/32	17 5/16	26	42	780 LB
TRIOX 1012–2012	10" RPM	3" FLG	14 7/16	6 5/8	6 5/8	27 5/16	33			30	10 1/4	26 3/8	18 1/2	41°	17°	22 1/2	18		3/4	16 1/4	7 1/2	4	---	6				33 29/32	18 9/16	27	43	1020 LB
TRIOX 1014–2014	12" ID	4" FLG	18	18 9/32	7 1/4	37 5/16	37			34	11 1/4	30 3/8	22	32°	17°	23 1/2	21 1/4			19 1/4	9	8	---	7 1/2	30°	45°	22 1/2	44 21/32	22 1/8	35	55	1500 LB
TRIOX 1016–2016	14" RPM	6" FLG	19			37 7/16	39			36	13 1/16	32 3/8	23 7/8	34°	13°	24 1/2	23 1/4	16		21 1/4								44 25/32	23 1/8			1700 LB
	16" ID																															

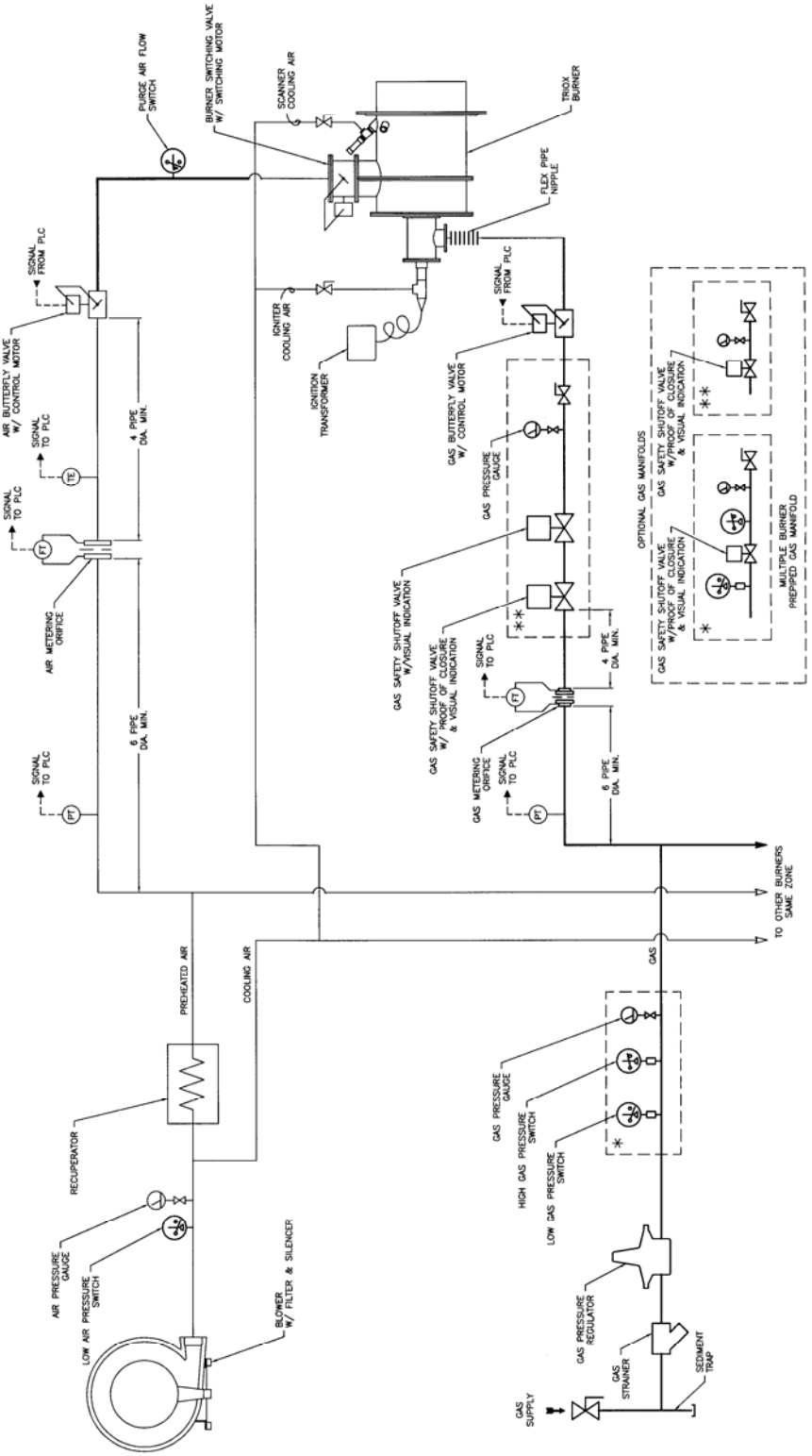
Y7524
(NOT TO SCALE)

NOTES:
1. AIR INLET MOUNTING CAN BE LOCATED @ 6 AND 12 O'CLOCK POSITIONS ONLY.
2. GAS INLET CAN BE LOCATED IN ANY POSITION THAT DOES NOT INTERFERE WITH UV SCANNER OR GAS PILOT.
3. WHEN MOUNTING BURNER, ENSURE THAT CONNECTIONS FOR UV SCANNER AND OBSERVATION PORT/GAS PILOT ARE LOCATED ABOVE THE BURNER BODY CENTER LINE.
4. GAS INLET FLANGE CONNECTIONS ARE ANSI 125 LB BOLT PATTERNS.

(See Reverse Side For Metric Dimensions)

TriOx
TRIPLE AIR STAGED ULTRA LOW NOx BURNER

TYPICAL MULTIPLE BURNER SYSTEM
PREHEATED AIR MASS FLOW CONTROL



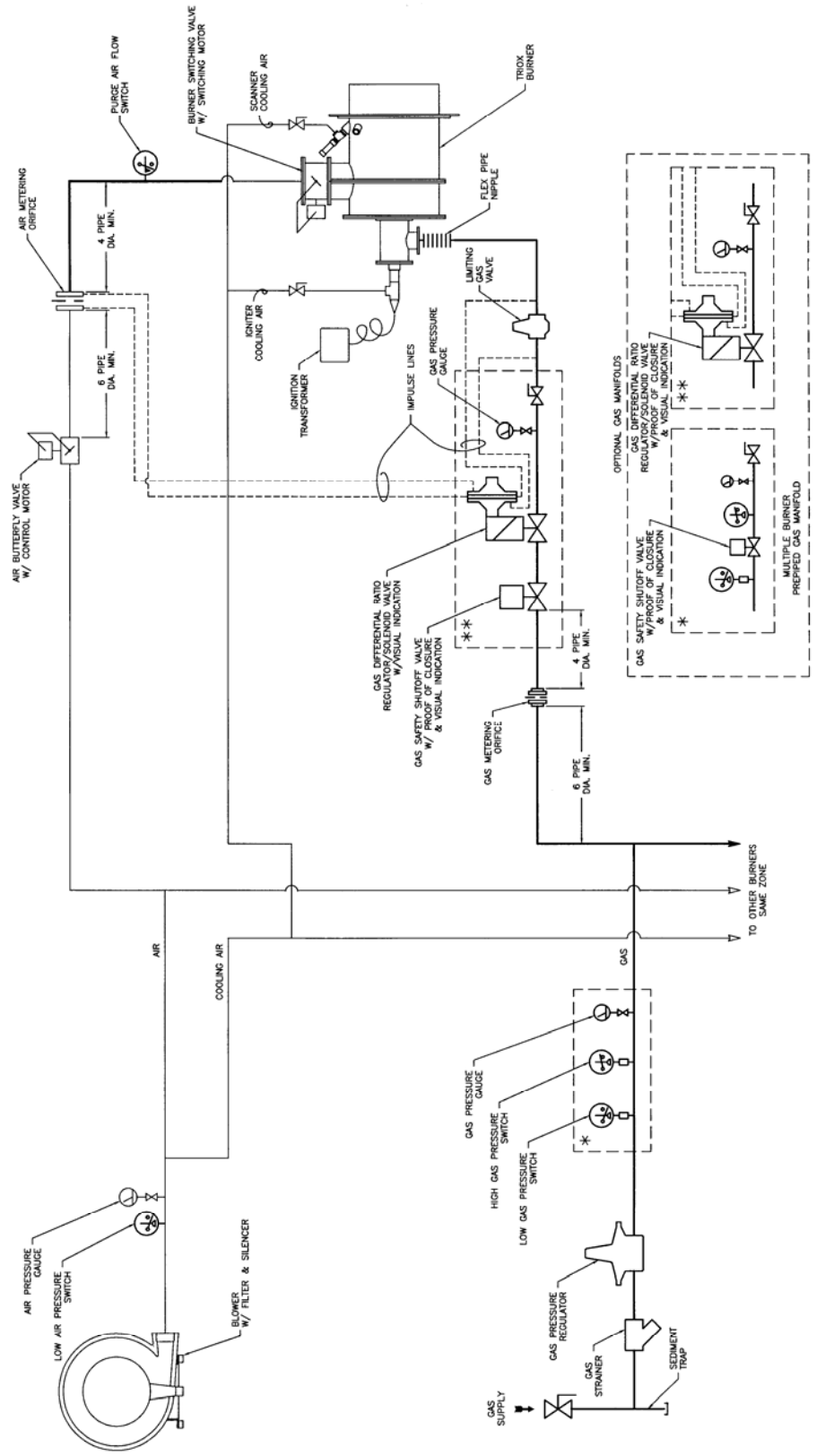
Y7531
(NOT TO SCALE)

NOTES:
1. OPTIONAL GAS MANIFOLDS ARE PERMITTED AS AN EXCEPTION PER NFPA 86 2003 EDITION REQUIREMENTS FOR MULTIPLE BURNERS FIRING INTO A COMMON HEATING CHAMBER, HOWEVER, SPECIAL FEATURES ARE REQUIRED IN THE ASSOCIATED CONTROL SYSTEM (SEE HAUCK APPLICATION SHEET GJ76).
2. IF USING OPTIONAL GAS PILOT (NOT SHOWN), CONSULT HAUCK FOR INSTALLATION SPECIFICS.

(OVER)

TriOx
TRIPLE AIR STAGED ULTRA LOW NOx BURNER

TYPICAL MULTIPLE BURNER SYSTEM
RATIO CONTROL



Y7530
(NOT TO SCALE)

NOTES:
1. OPTIONAL GAS MANIFOLDS ARE PERMITTED AS AN EXCEPTION PER NFPA 86 2003 EDITION REQUIREMENTS FOR MULTIPLE BURNERS FIRING INTO A COMMON HEATING CHAMBER, HOWEVER, SPECIAL FEATURES ARE REQUIRED IN THE ASSOCIATED CONTROL SYSTEM (SEE HAUCK APPLICATION SHEET GJ76).
2. IF USING OPTIONAL GAS PILOT IGNITER (NOT SHOWN), CONSULT HAUCK FOR INSTALLATION SPECIFICS.