NOZZLE MIX BURNERS
NM SERIES

FEATURES

- Mixer body: Cast iron G25
- Plate: Cast iron G25
- Air tube: AISI 304
- Operation with pre-heated air up to: 450°
- Adequate to different types of gas: CH_4/L.P./propane/etc.
- Standard refractory block max. temp.: 1750°C
- Capacity range: 10 to 3700 kW
- Single tunnel turndown range: 10:1
- Multiple tunnel turndown range: 60:1
- Excellent flame stability: excess air, excess fuel, on ratio firing
- Low NO_x level.
- Wall mounting flanges to fasten the block holder to the furnace shell are threaded to allow for positioning of accessories: pilot burner, flame detectors (electrodes or UV scanners), peepsight.
- Separated air and gas inlets, mixing at discharge point, no flashback.

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APPLICATIONS

- Tank melting kilns for frits.
- Billets reheating furnace.
- Aluminium melting furnace.
- Forging furnaces.
- Air heaters.
- Heat treat furnaces.
- Incinerators.
- Stress Relieving Furnaces.
- Brick furnaces.
- Ladle and crucible melting reheating.
- Driers.

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DESCRIPTION

Nozzle Mix Burners are high flame, high capacity units. Gas and air are mixed only at the point of discharge. The swirling air stream produces a negative vortex at the block mouth. Fuel enters the vortex mixing rapidly, producing intense combustion.
Nozzle Mix burners may work both with cold and pre-heated air allowing for 25 to 30% saving. When cold air is entrained, modulation of the main air valve, from a temperature controller signal, changes the air pressure and the air flow to the burner. With equal or proportional air and gas pressure drops across both orifices, the flows will always maintain correct ratios.
In case of pre-heated air, modulation of the butterfly valve, located upstream of the heat exchanger, from a temperature controller signal, changes the air pressure and the air flow to the burner. Flanged Orifice Plate meters at convenient point in the air and gas supply lines to the burners measure flows. The air impulse to the Balanced Zero Regulator will modulate the gas outlet pressure to always equal the air pressure.

INSTALLATION

NM burners are usually mounted on the wall. Other mounting positions are not recommended; specify if it is absolutely required when you order it.
The furnace refractory should be set to leave some room on all sides of the block. This space should be packed with flexible, refractory, ceramic fiber protected by 20 mm of refractory concrete on all sides to allow for expansion of the walls (see technical note). Flexible connector are recommended for air and gas connections at the burner to allow slight movement or misalignment of piping and are required when pre-heated air is involved. Air and gas connections are Pyronics' standard threaded, welding flanged type. They may rotate by 90°.

IGNITION AND FLAME DETECTION

NM burners must be ignited at low fire with a PBST blast pilot.
Pilot burner must be switched off after ignition of main burner thus flame detection must be done by counterclockwise UV Scanner. For low capacity burners direct spark ignition may be done through electrodes WAND or DSE. In this case UV-2 ultraviolet scanners must be used.
Flame detection systems are required on all burners with furnace temperatures below 750°C.

Catalog No.	Pilot burner ignition		Electrode ignition	
	Ignition	Detection	Ignition	Detection
101 NM	P42PBST-W/X	UV-2 / Wand *	14MM	UV-2
201 NM	P42PBST-W/X	UV-2 / Wand *	Wand - 201 NM	UV-2
301 NM - 601 NM	P64PBST	UV-2 / 6EN-150 *	DSE - 1	UV-2
1001 NM - 1501 NM	P64PBST	UV-2 / 6EN-300 *	DSE - 1	UV-2
2501 NM	P86PBST	UV-2 / 6EN-300 *	(not available)	(not available)
4001/6001/8001 NM	P86PBST	UV-2 / 6EN-300 *	(not available)	(not available)

(*) In most cases, we suggest you to make flame detection through UV- scanner. In some particular cases, it is possible to use continue pilot burner with detection electrode.

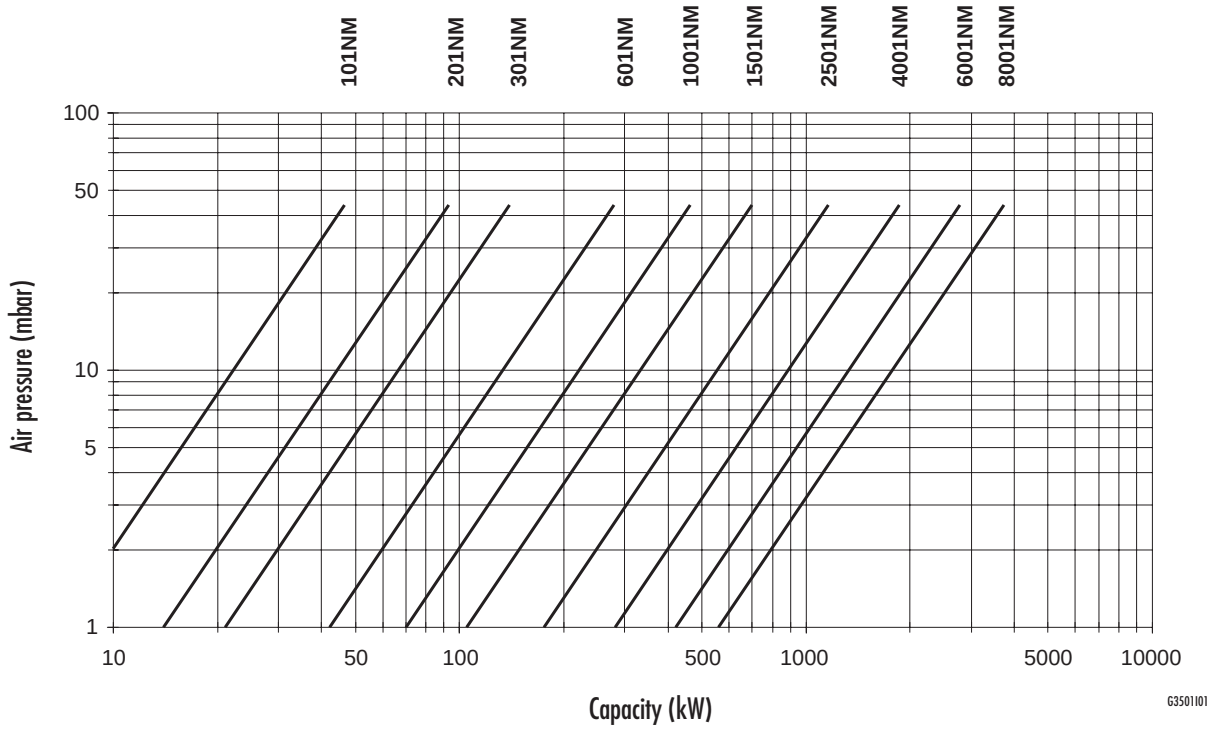
CAPACITY TABLE

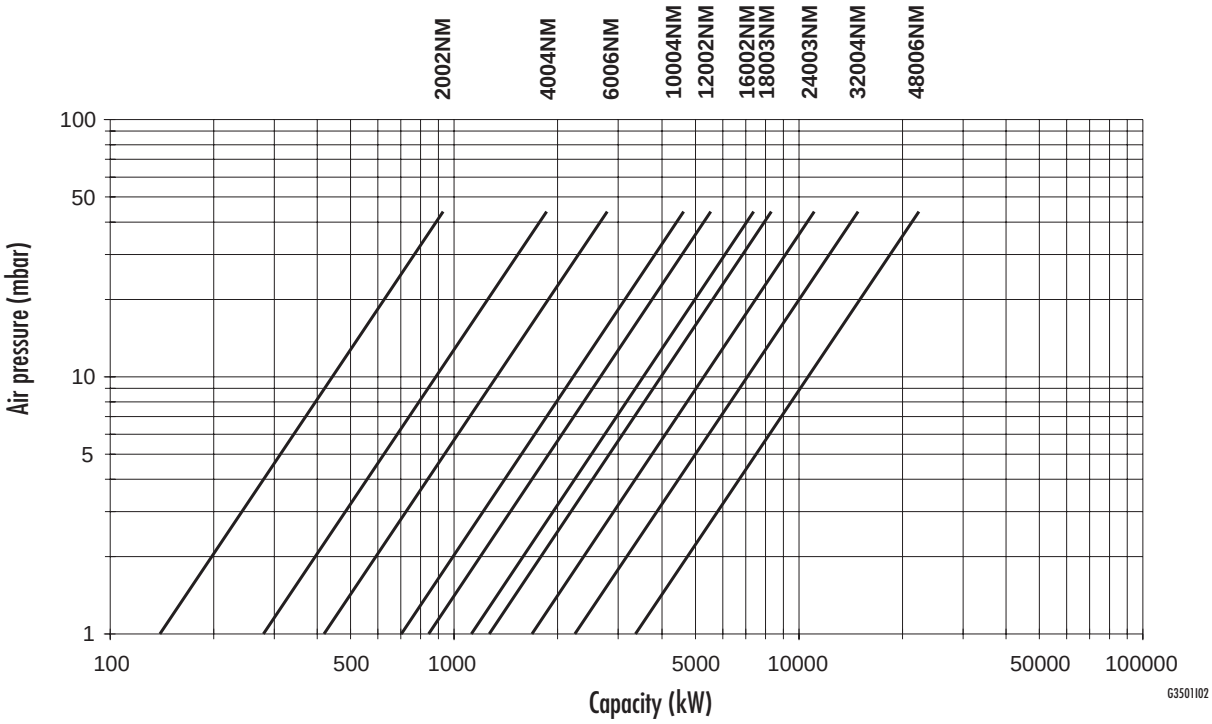
Single tunnel	Pipe size		Maximum capacity in kW at various air and gas pressures at burner (in mbar)									Flame length mm (2)
	Aria	Gas	2.2	4.4	8.8	13.2	17.6 (1)	22.0	26.4	35.2	44.0 (3)	
101 NM	3/4"	3/8"	10	15	21	26	29	33	36	41	46	150÷200
201 NM	1.1/4"	3/4"	21	29	41	51	59	66	72	83	93	200÷300
301 NM	1.1/2"	1"	31	44	62	76	88	98	108	123	139	200÷500
601 NM	2"	1.1/4"	62	111	123	152	176	196	215	246	278	250÷850
1001 NM	3"	1.1/4"	103	147	205	255	293	328	357	410	463	300÷1000
1501 NM	3"	1.1/2"	167	220	293	381	440	498	542	615	703	600÷1250
2501 NM	4"	2.1/2"	258	366	519	633	733	820	897	1037	1157	760÷1500
4001 NM	6"	3"	410	586	820	1014	1172	1313	1436	1641	1852	1200÷2000
6001 NM	8"	3"	615	879	1231	1524	1758	1963	2154	2461	2784	1800÷2500
8001 NM	8"	3"	828	1172	1656	2031	2344	2623	2872	—	—	2400÷3500

Multiple tunnel	Pipe size		Maximum capacity in kW at various air and gas pressures at burner (in mbar)									Flame length mm (2)
	Aria	Gas	2.2	4.4	8.8	13.2	17.6 (1)	22.0	26.4	35.2	44.0 (3)	
2002 NM	4"	2 x 1.1/4"	205	293	410	507	586	656	718	820	926	300÷1000
4004 NM	6"	4 x 1.1/4"	410	586	820	1014	1172	1313	1436	1641	1852	300÷1000
6006 NM	8"	6 x 1.1/4"	615	879	1231	1524	1758	1963	2154	2461	2784	300÷1000
10004 NM	10"	4 x 2.1/2"	1026	1465	2051	2549	2930	3282	3575	4102	4630	760÷1500
12002 NM	10"	2 x 3"	1245	1758	2491	3047	3516	3927	4307	4981	5567	1800÷2500
16002 NM	10"	2 x 3"	1656	2344	3311	4058	4688	5245	5743	—	—	2400÷3500
18003 NM	12"	3 x 3"	1861	2637	3721	4571	5274	5890	6447	7443	8351	1800÷2500
24003 NM	12"	3 x 3"	2491	3516	4981	6095	7033	7853	8615	—	—	2400÷3500
32004 NM	14"	4 x 3"	3311	4688	6622	8117	9377	10490	11487	—	—	2400÷3500
48006 NM	20"	6 x 3"	4981	7033	9963	1219	14065	15735	17230	—	—	2400÷3500

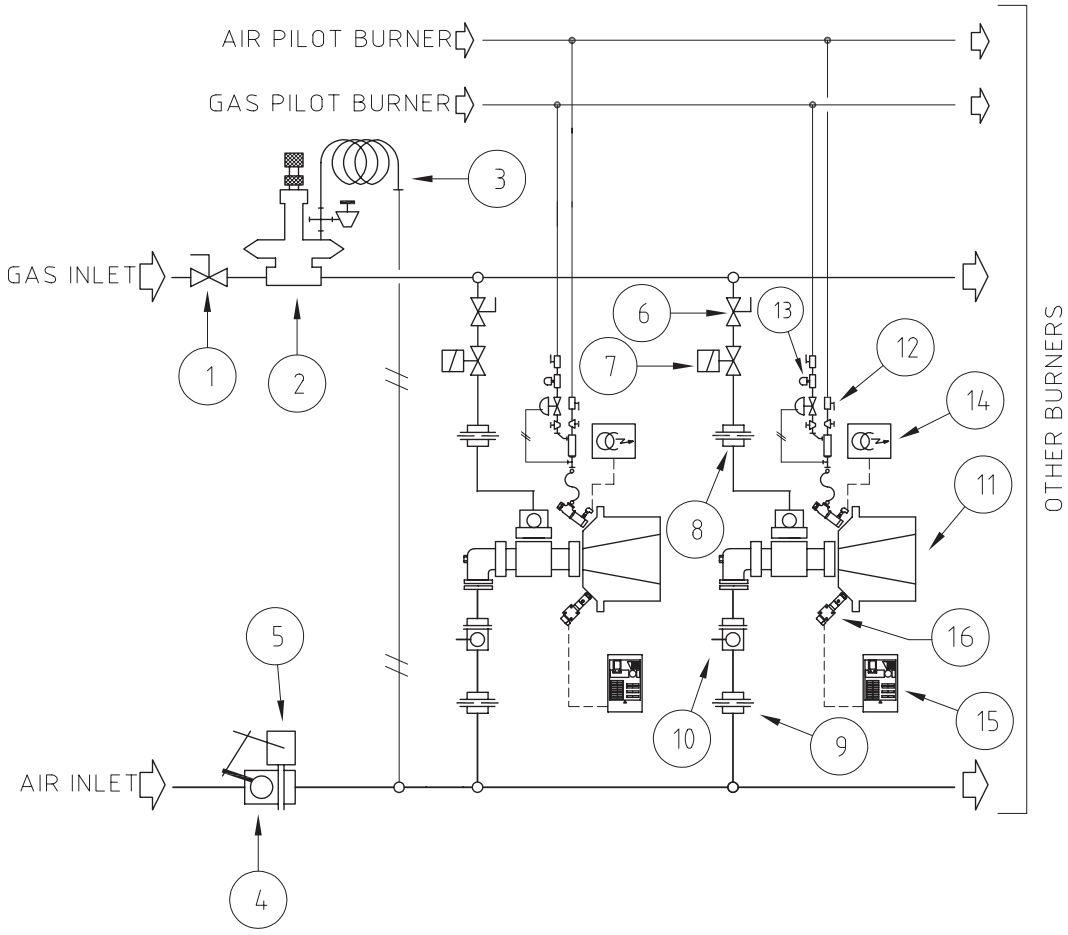
Notes: 1) Nominal maximum capacity range.
2) Flame dimensions are approximate, referred to burners feeded with CH_4, working at stoichiometric ratio, in free air. Values are included in a range: minimum value is referred to burner working at nominal capacity (1), higher value at maximun capacity (3).

CAPACITY TABLE





FLOW CHART (COLD AIR)



Pos.	Model Identification	Pos.	Model Identification
1	Main gas ball valve	9	Orifice flow meter for ΔP air
2	Balanced Zero Regulator	10	Manual air butterfly valve
3	Impulse line	11	Main burner
4	Motorized air valve	12	Pilot burner
5	Electric control	13	Pilot burner solenoid, safety gas valve
6	Gas ball valve	14	Ignition transformer
7	Main burner solenoid, safety gas valve	15	Flame detection
8	Orifice flow meter for ΔP gas	16	UV Scanner

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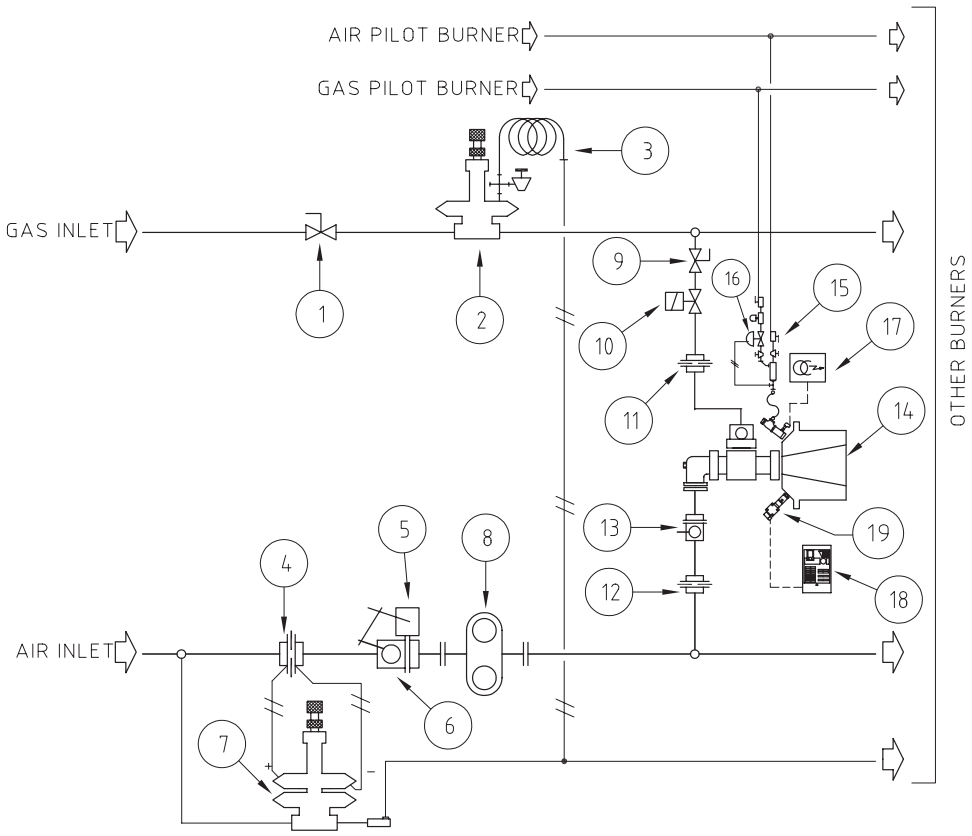
FLOW CHART (PRE-HEATED AIR)



Pos.	Model Identification	Pos.	Model Identification
1	Main gas ball valve	11	Orifice flow meter for ΔP gas
2	Balanced Zero Regulator	12	Orifice flow meter for ΔP air
3	Impulse line	13	Manual air butterfly valve
4	Calibrated orifice for ΔP air	14	Main burner
5	Electric control	15	Pilot burner
6	Motorized air valve	16	Pilot burner safety gas valve
7	Regulator flow control	17	Ignition transformer
8	Heat exchanger	18	Flame detection
9	Gas ball valve at each burner	19	UV scanner
10	Main burner solenoid, safety gas valve		

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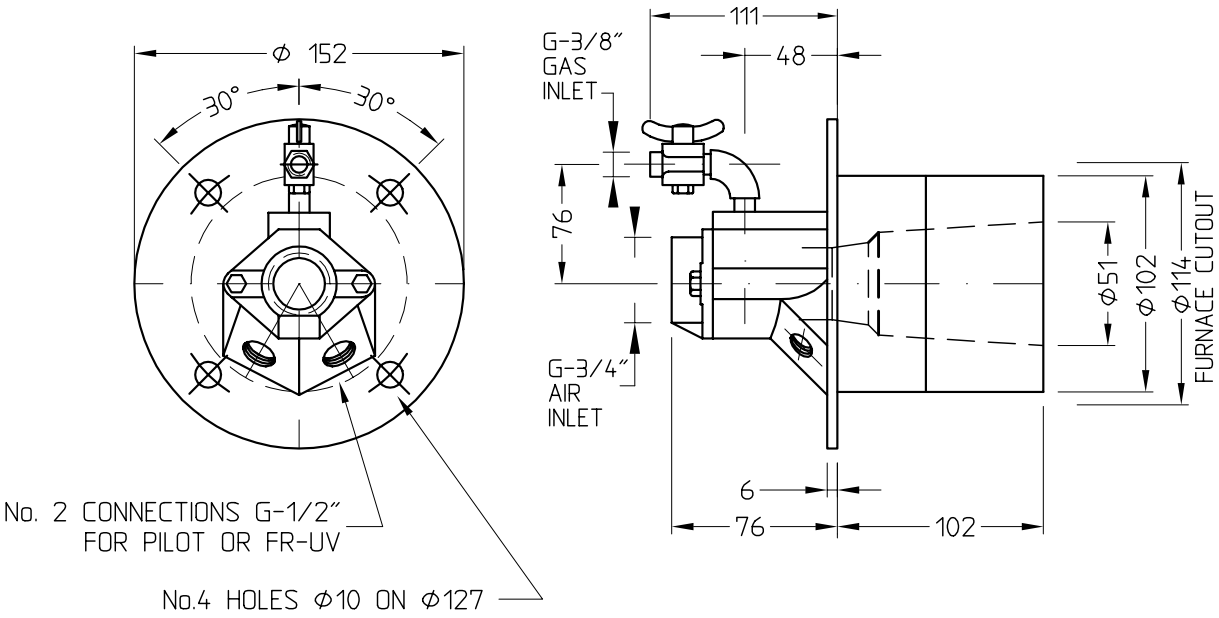
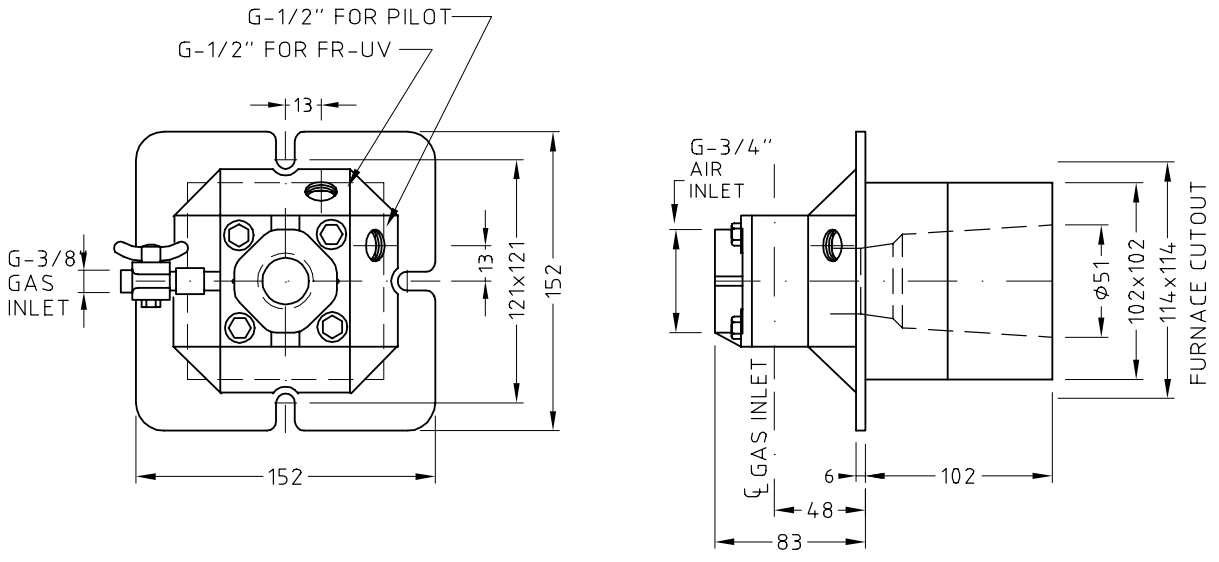
DIMENSIONS (101 NM)

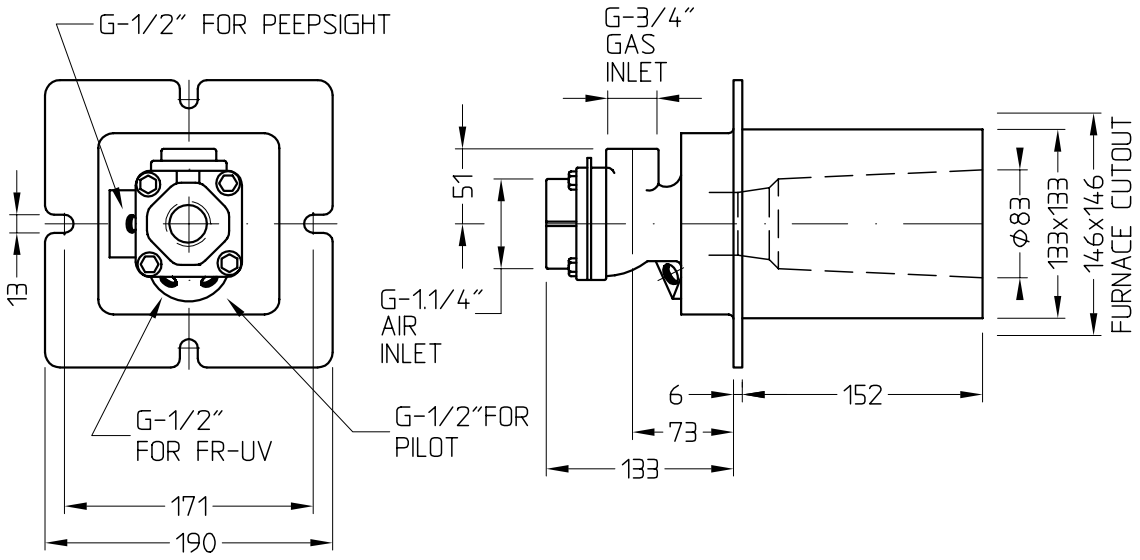


D3501E03

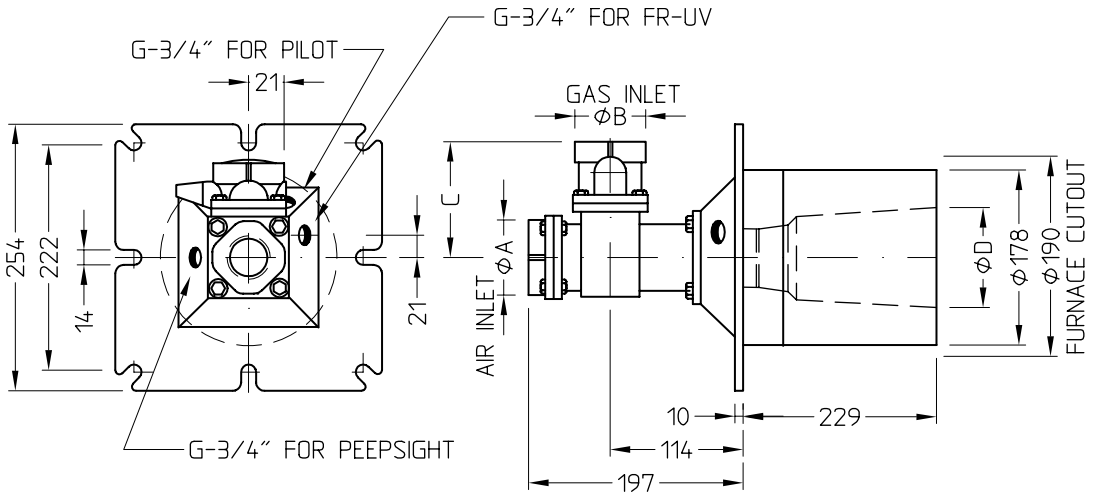


D3501E04

DIMENSIONS (201 NM)

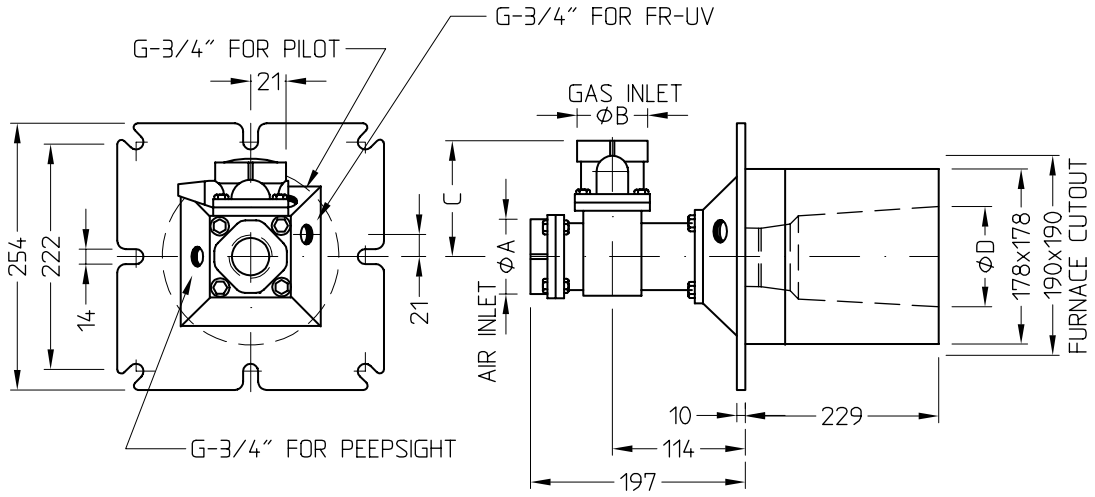


DIMENSIONS (301 NM / 601 NM)



Catalog no.	A	B	C mm	D mm
301 NM-F-R	G - 1.1/2"	G - 1"	70	108
301 NM-GA-R	G - 1.1/2"	G - 1"	95	108
601 NM-F-R	G - 2"	G - 1.1/4"	83	114
601 NM-GA-R	G - 2"	G - 1.1/4"	108	114

D3501E06



Catalog no.	A	B	C mm	D mm
301 NM-F-S	G - 1.1/2"	G - 1"	70	108
301 NM-GA-S	G - 1.1/2"	G - 1"	95	108
601 NM-F-S	G - 2"	G - 1.1/4"	83	114
601 NM-GA-S	G - 2"	G - 1.1/4"	108	114

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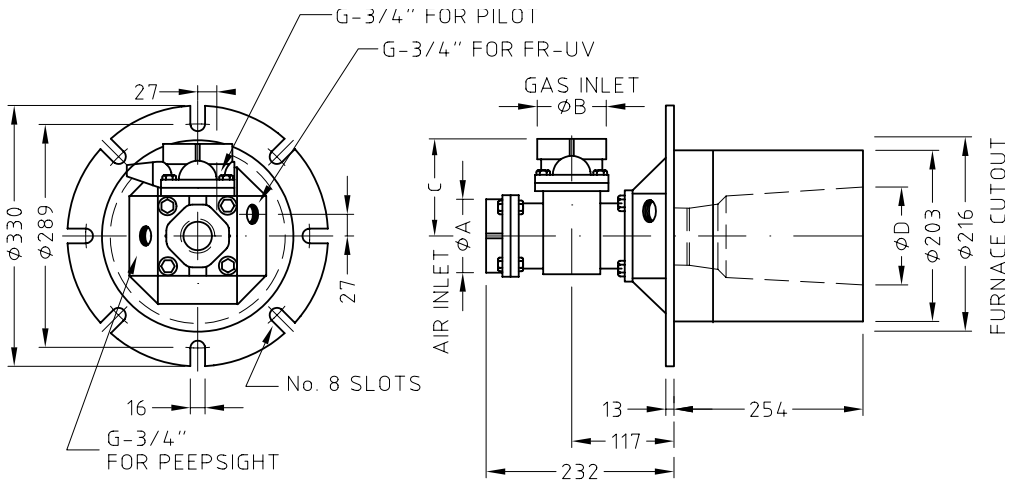
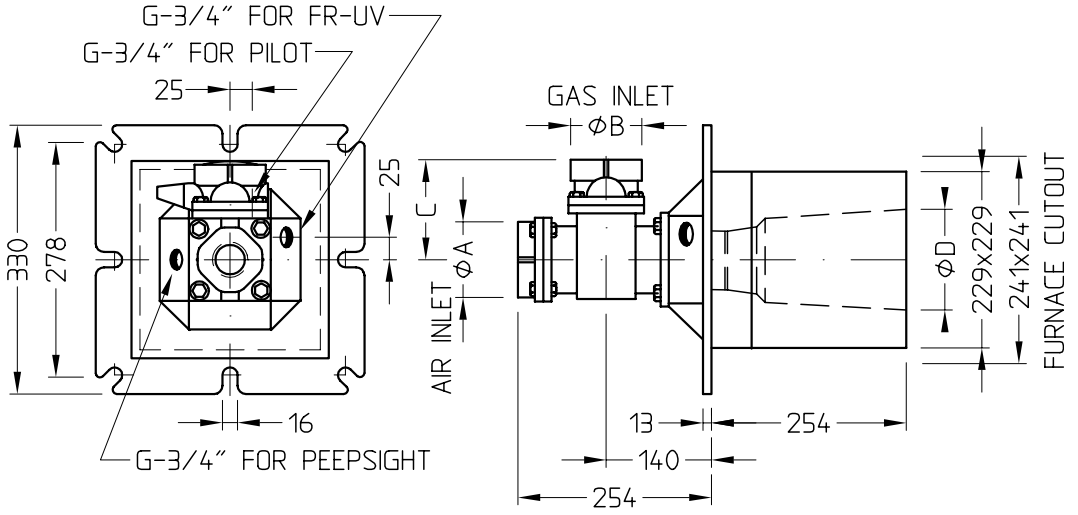
DIMENSIONS (1001 NM / 1501 NM)



Catalog no.	A	B	C mm	D mm
1001 NM-F-R	G - 3"	G - 1.1/4"	95	121
1001 NM-GA-R	G - 3"	G - 1.1/4"	124	121
1501 NM-F-R	G - 3"	G - 1.1/2"	95	127
1501 NM-GA-R	G - 3"	G - 1.1/2"	133	127

D3501E08



Catalog no.	A	B	C mm	D mm
1001 NM-F-S	G - 3"	G - 1.1/4"	95	121
1001 NM-GA-S	G - 3"	G - 1.1/4"	124	121
1501 NM-F-S	G - 3"	G - 1.1/2"	95	127
1501 NM-GA-S	G - 3"	G - 1.1/2"	133	127

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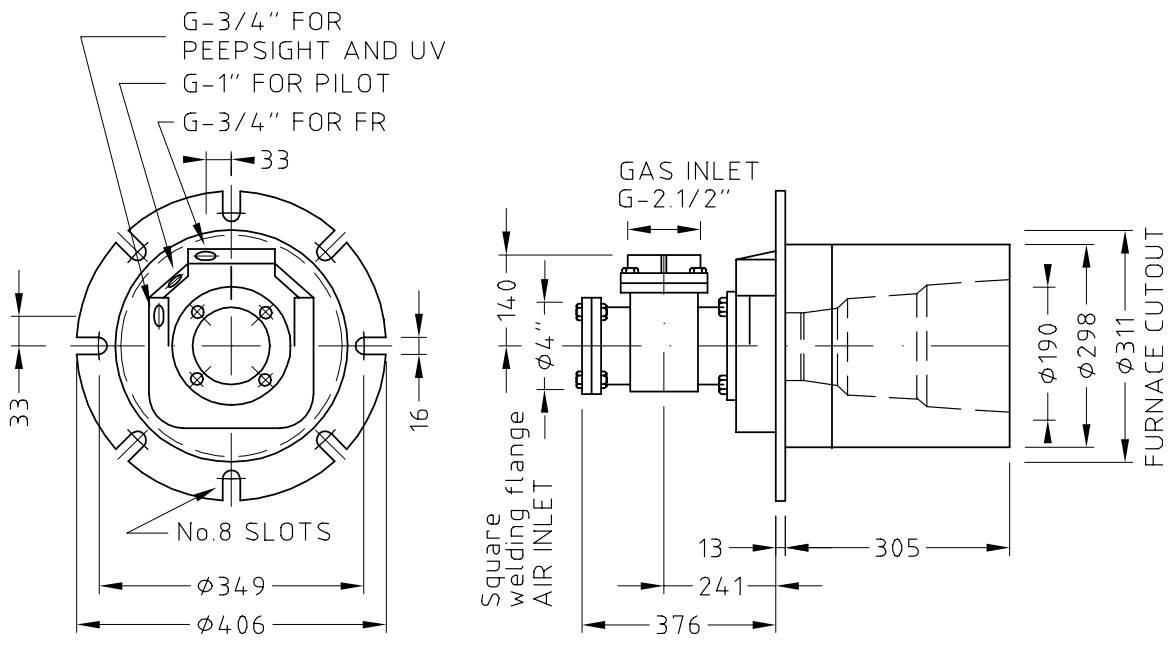
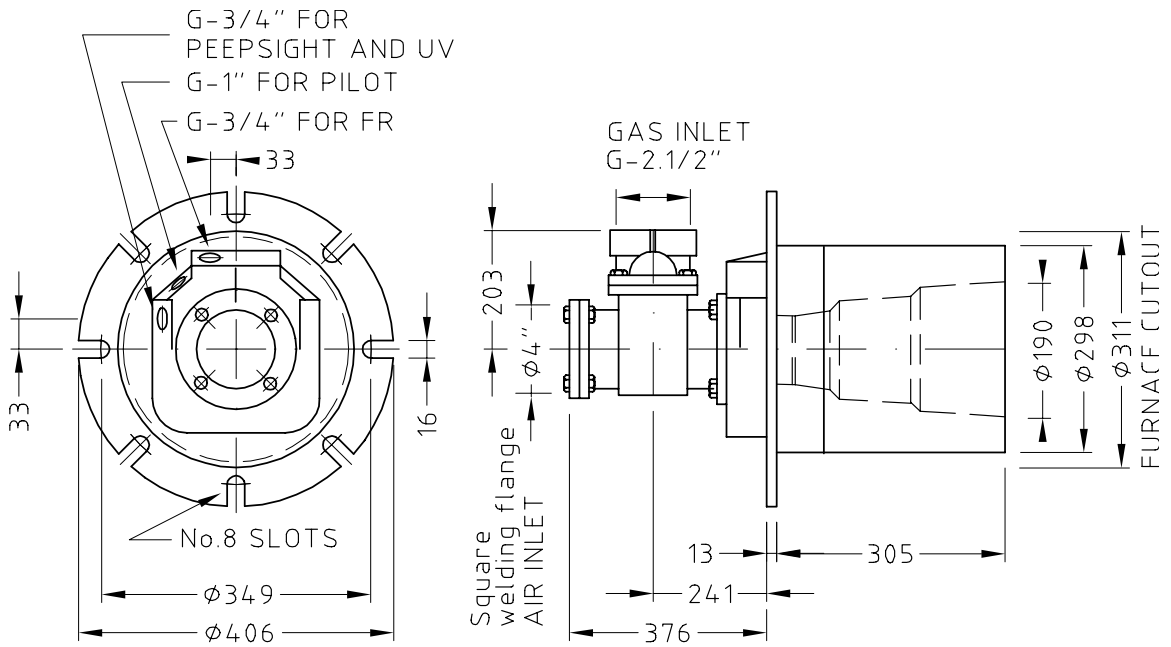
DIMENSIONS (2501 NM-R)

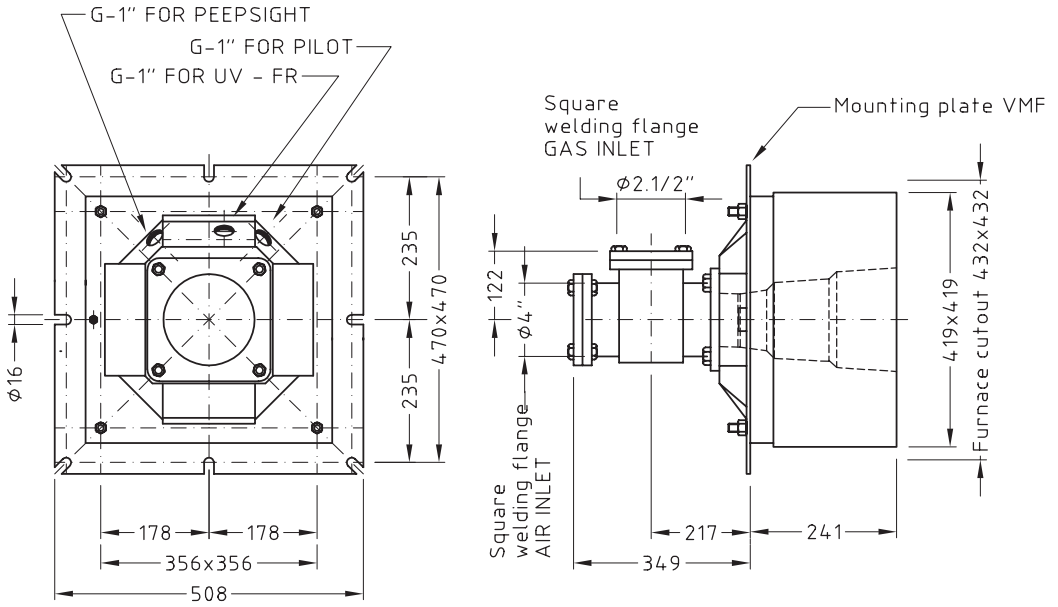


D3501E10



D3501E11

DIMENSIONS (2501 NM-S)



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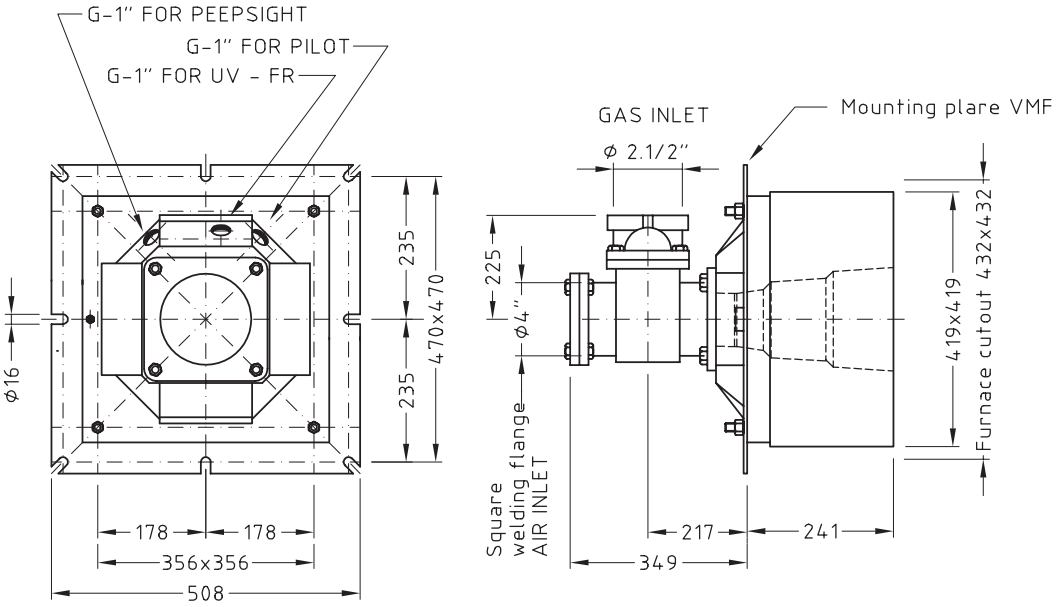
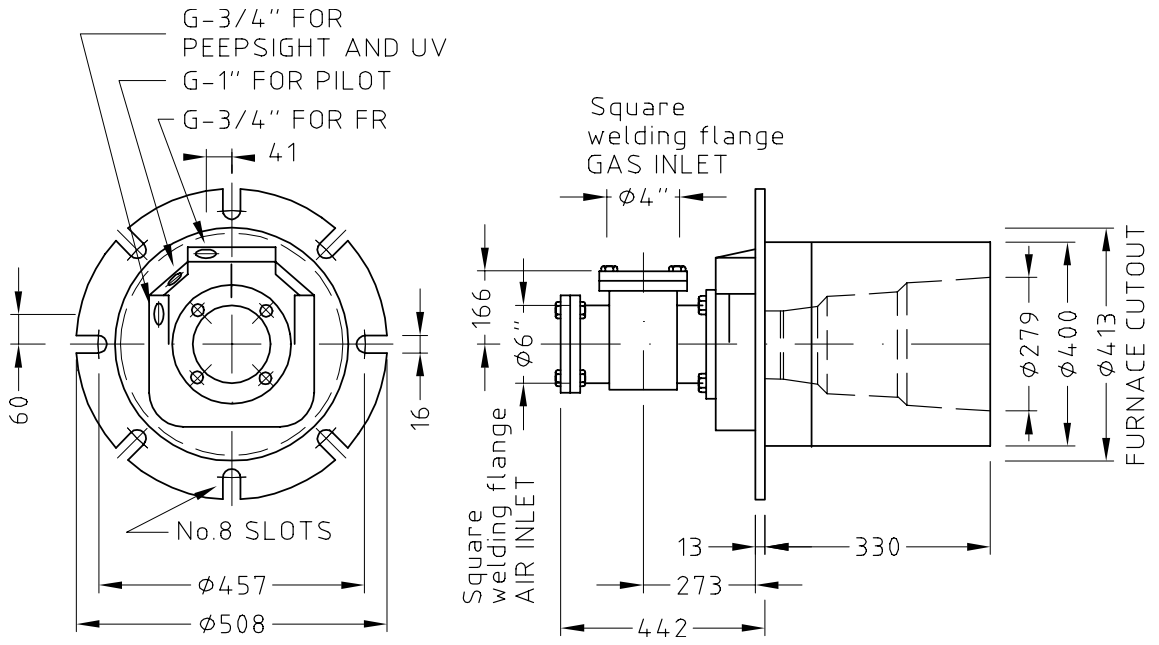


D3501E27

DIMENSIONS (4001 NM-R)



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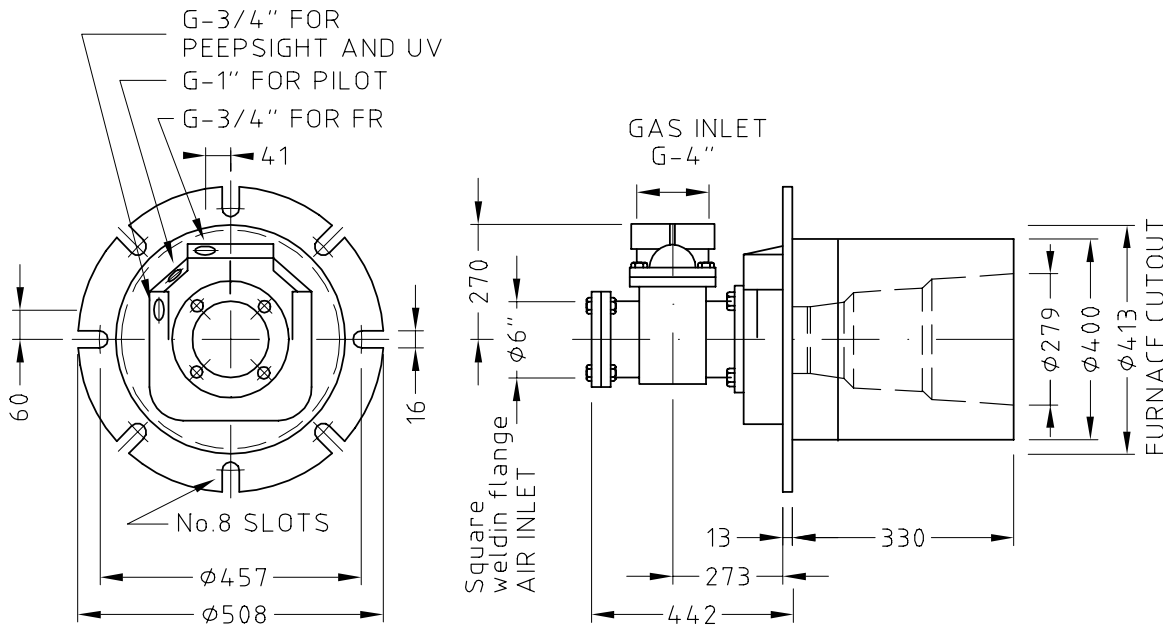

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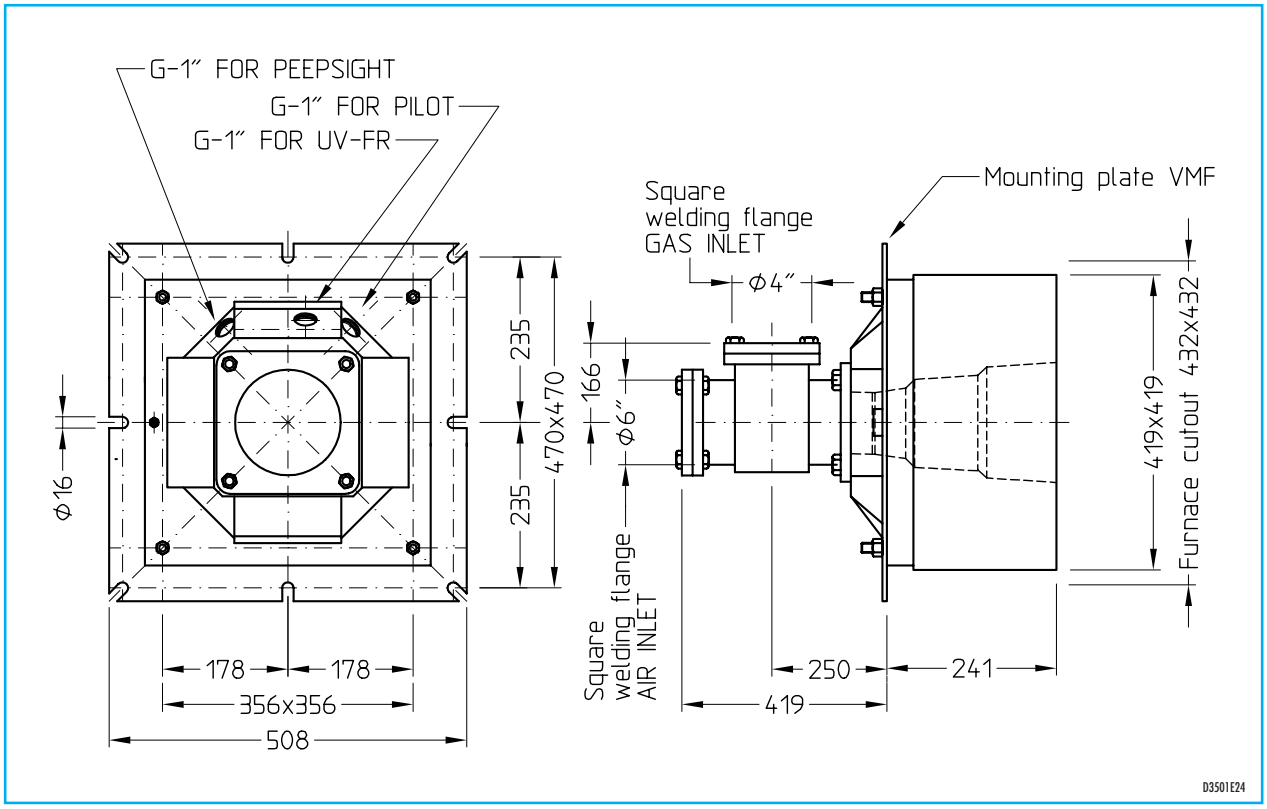
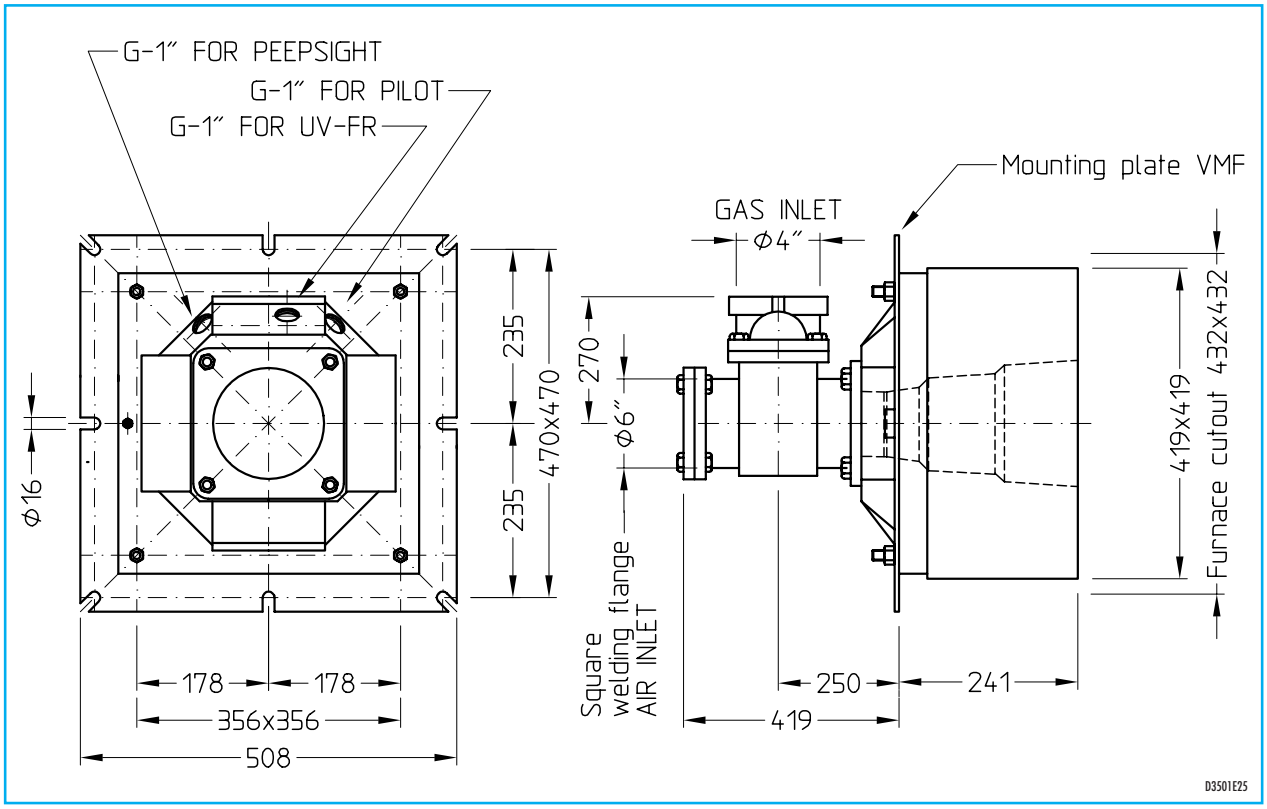
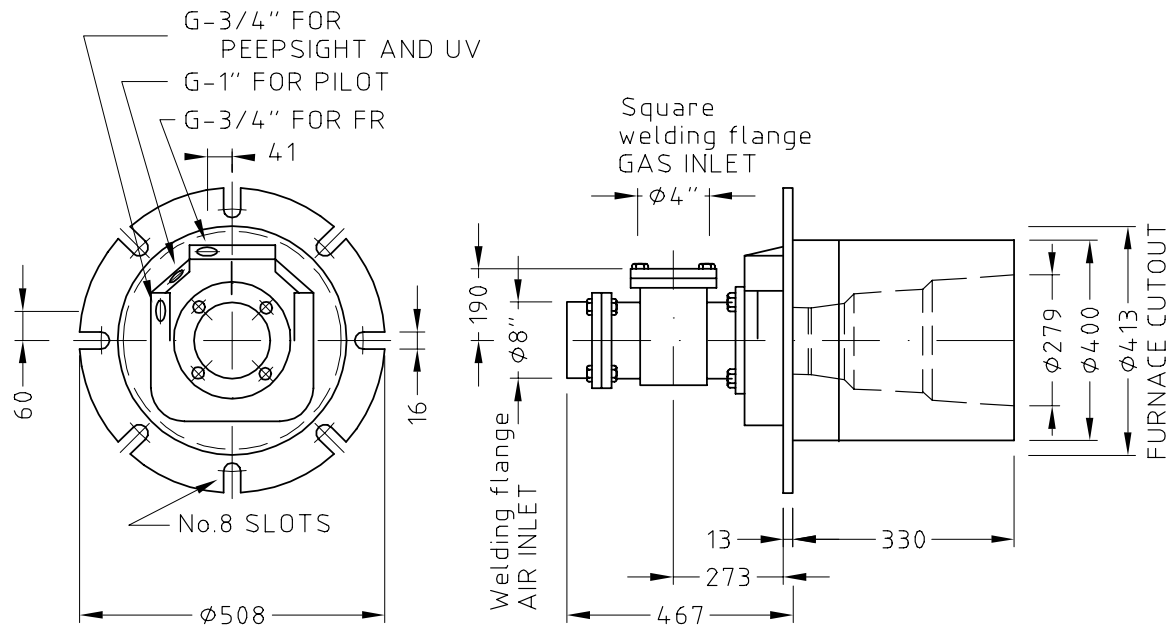




DIMENSIONS (6001 NM-R / 8001 NM-R)



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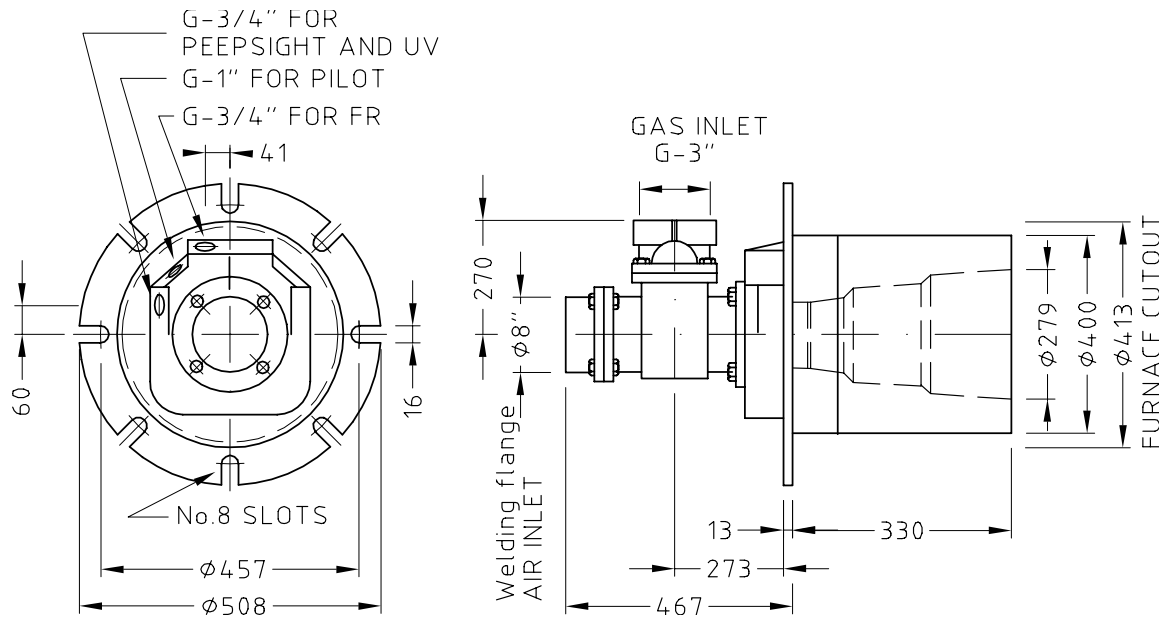

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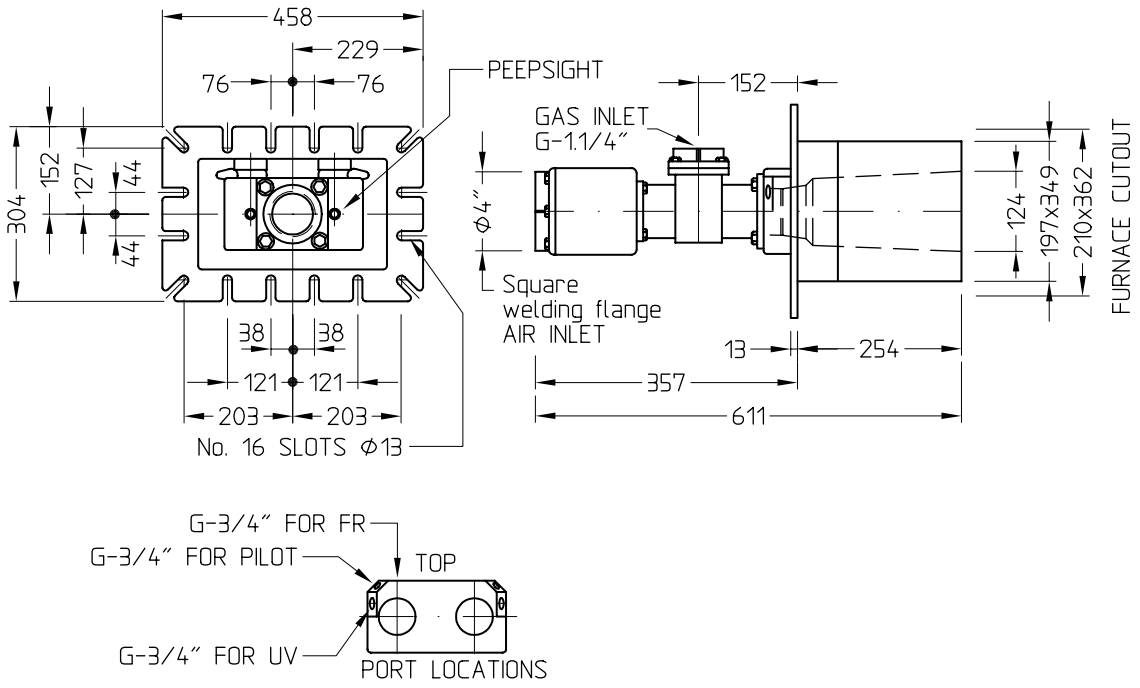
DIMENSIONS (2002 NM)



D3501E16

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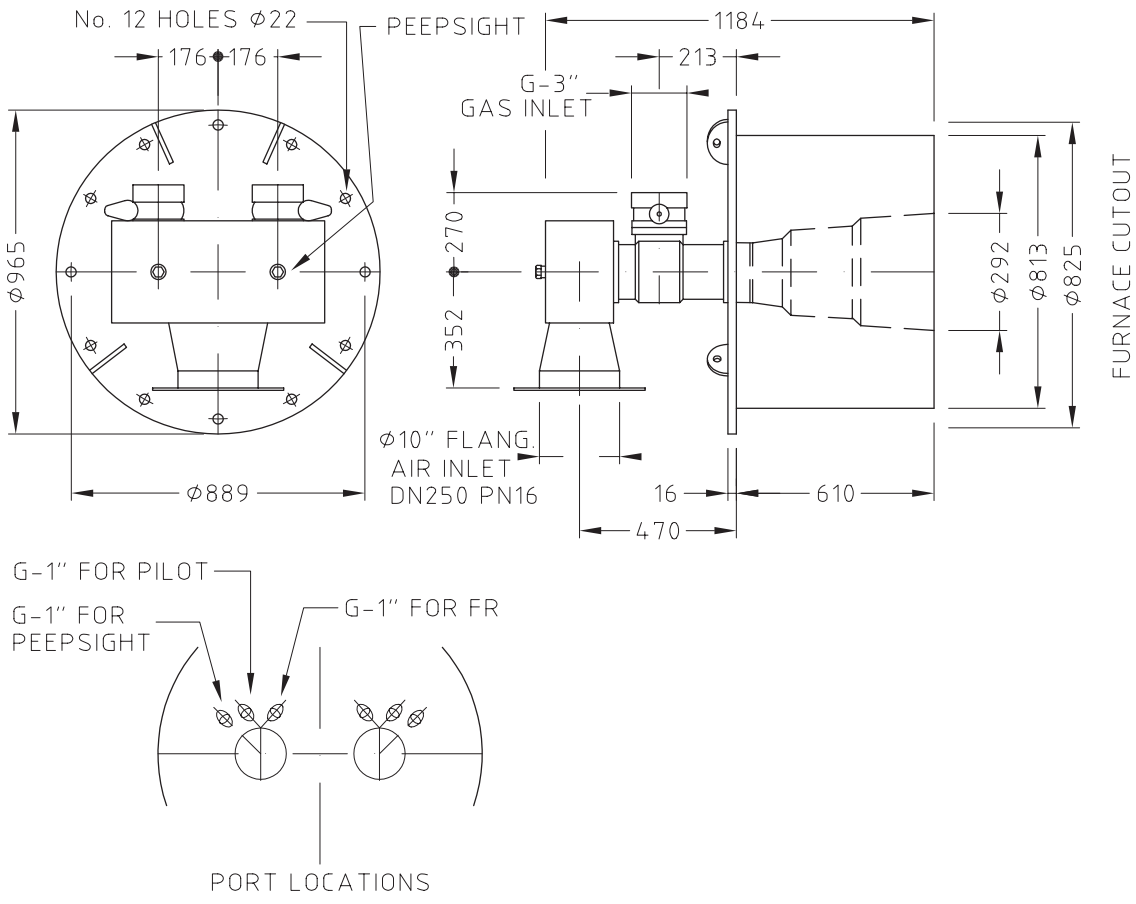

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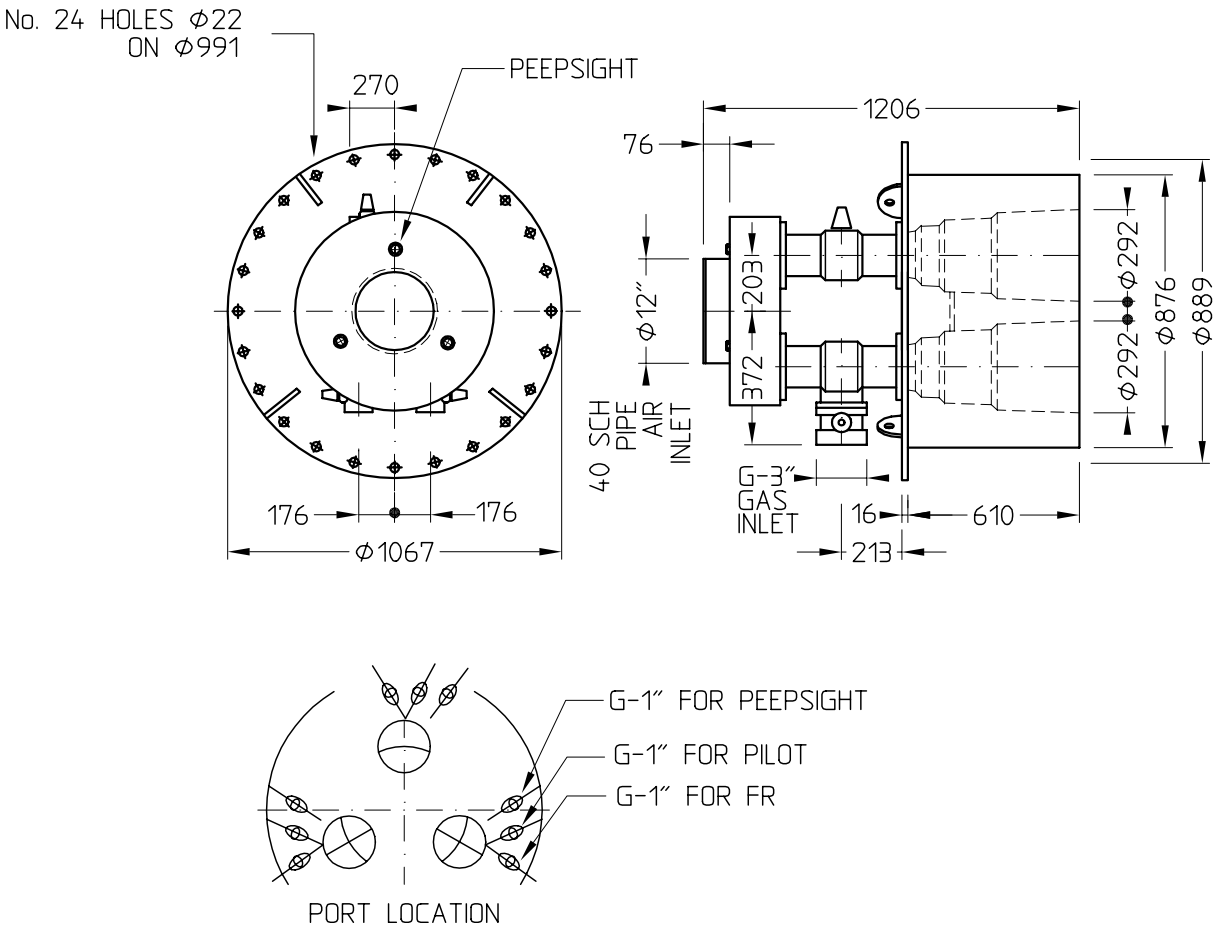
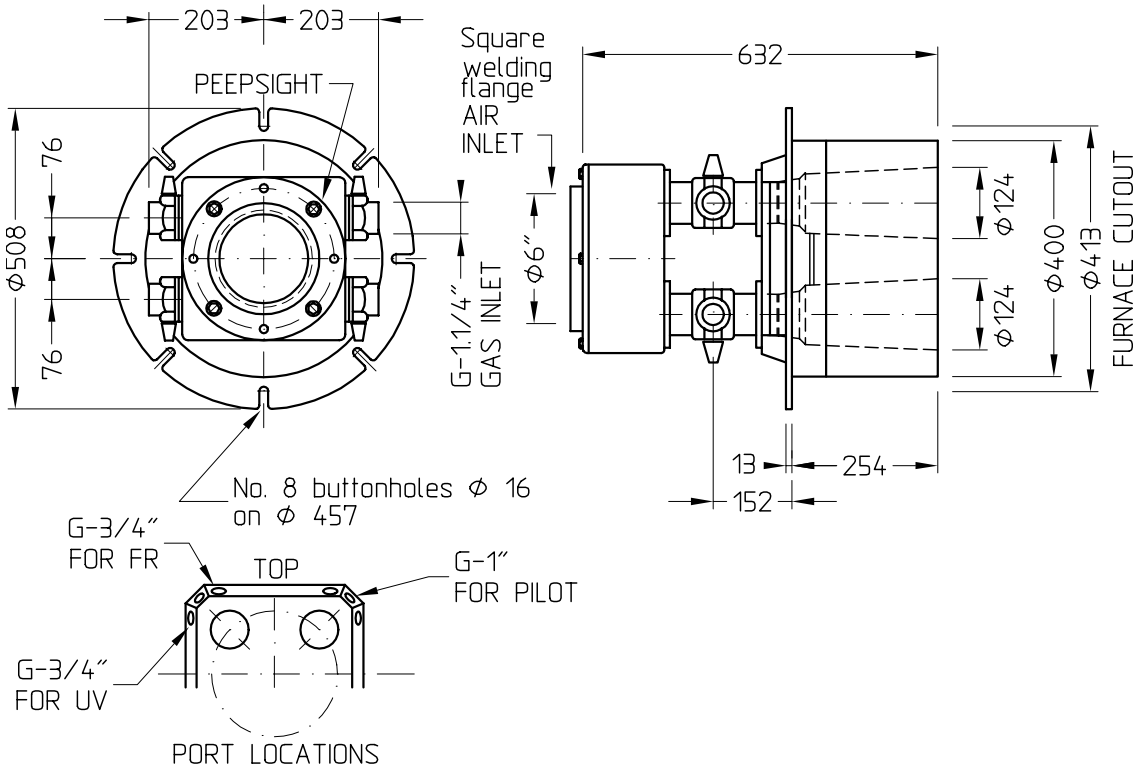
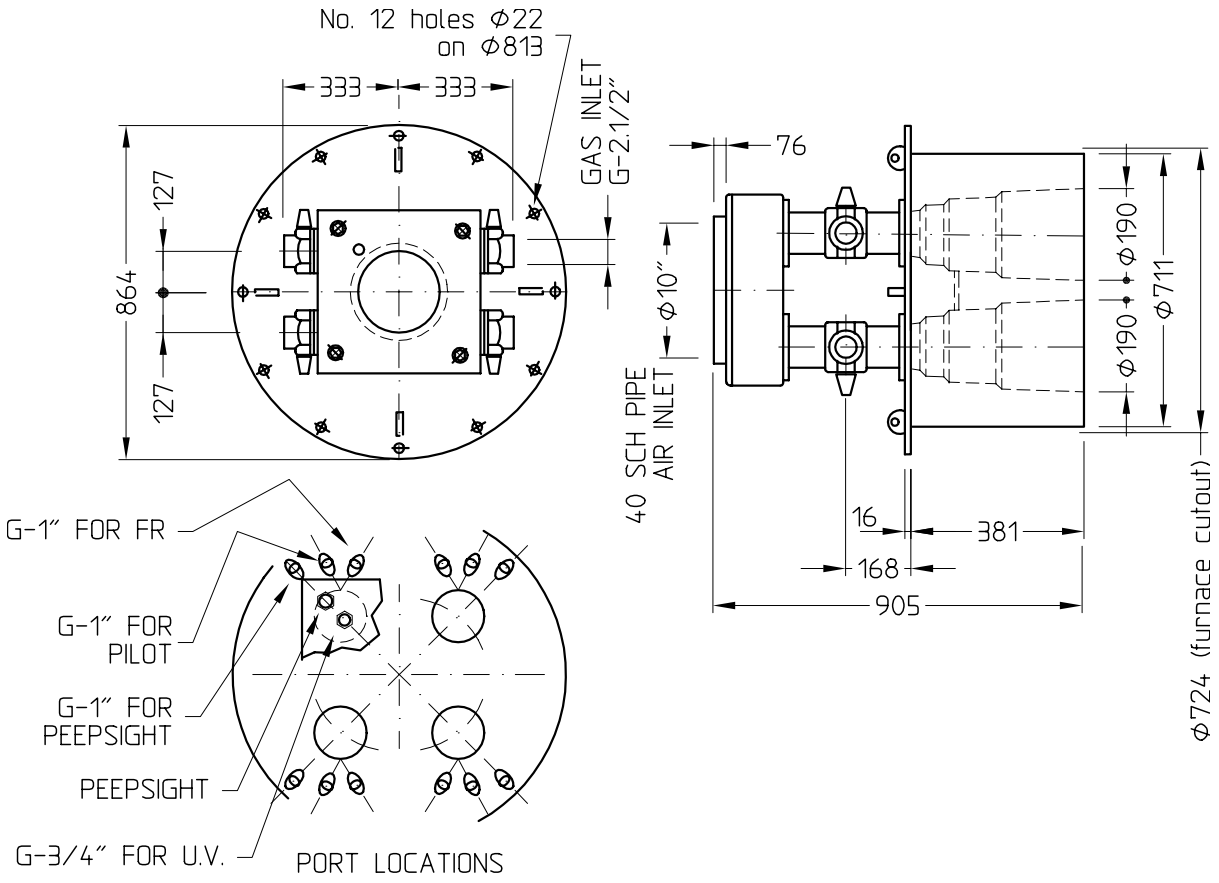
DIMENSIONS (18003 NM / 24003 NM)



DIMENSIONS (4004 NM)



DIMENSIONS (10004 NM)



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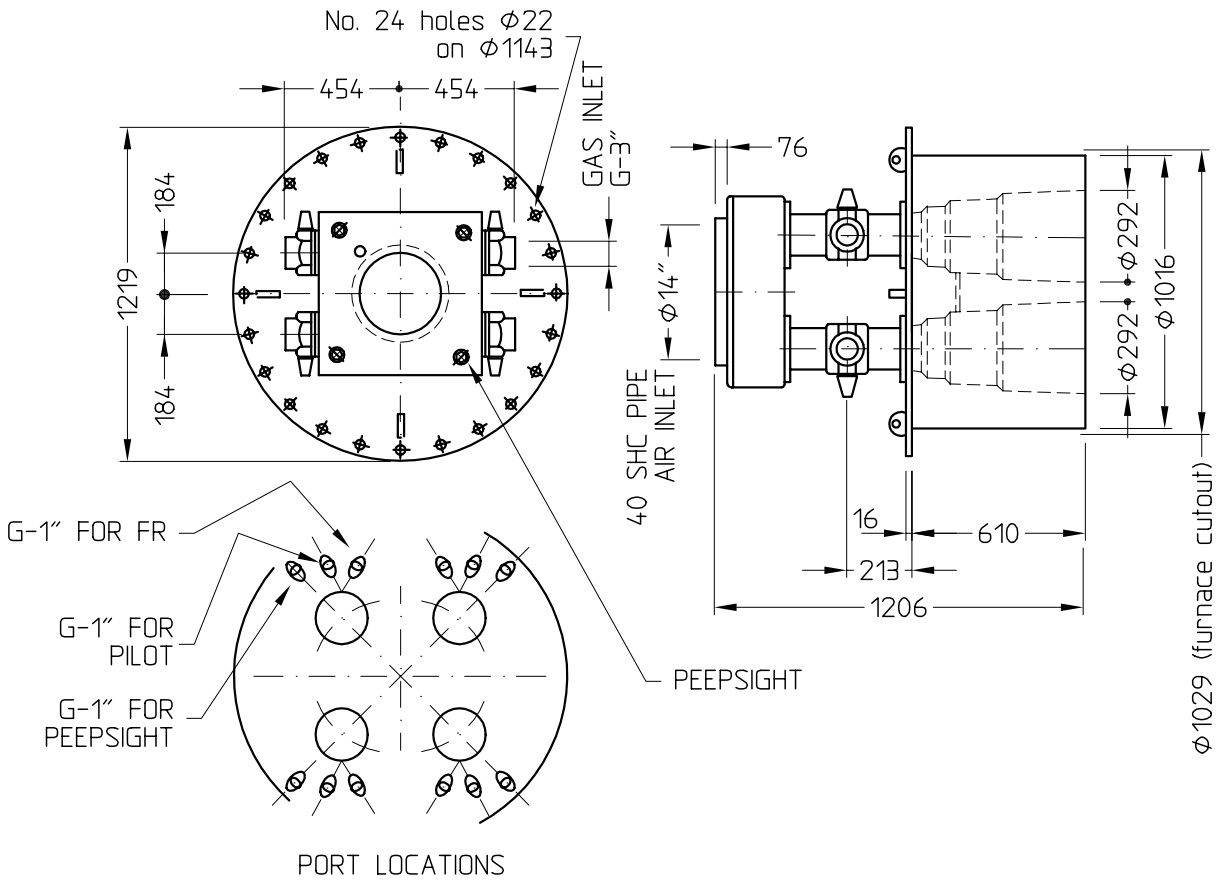
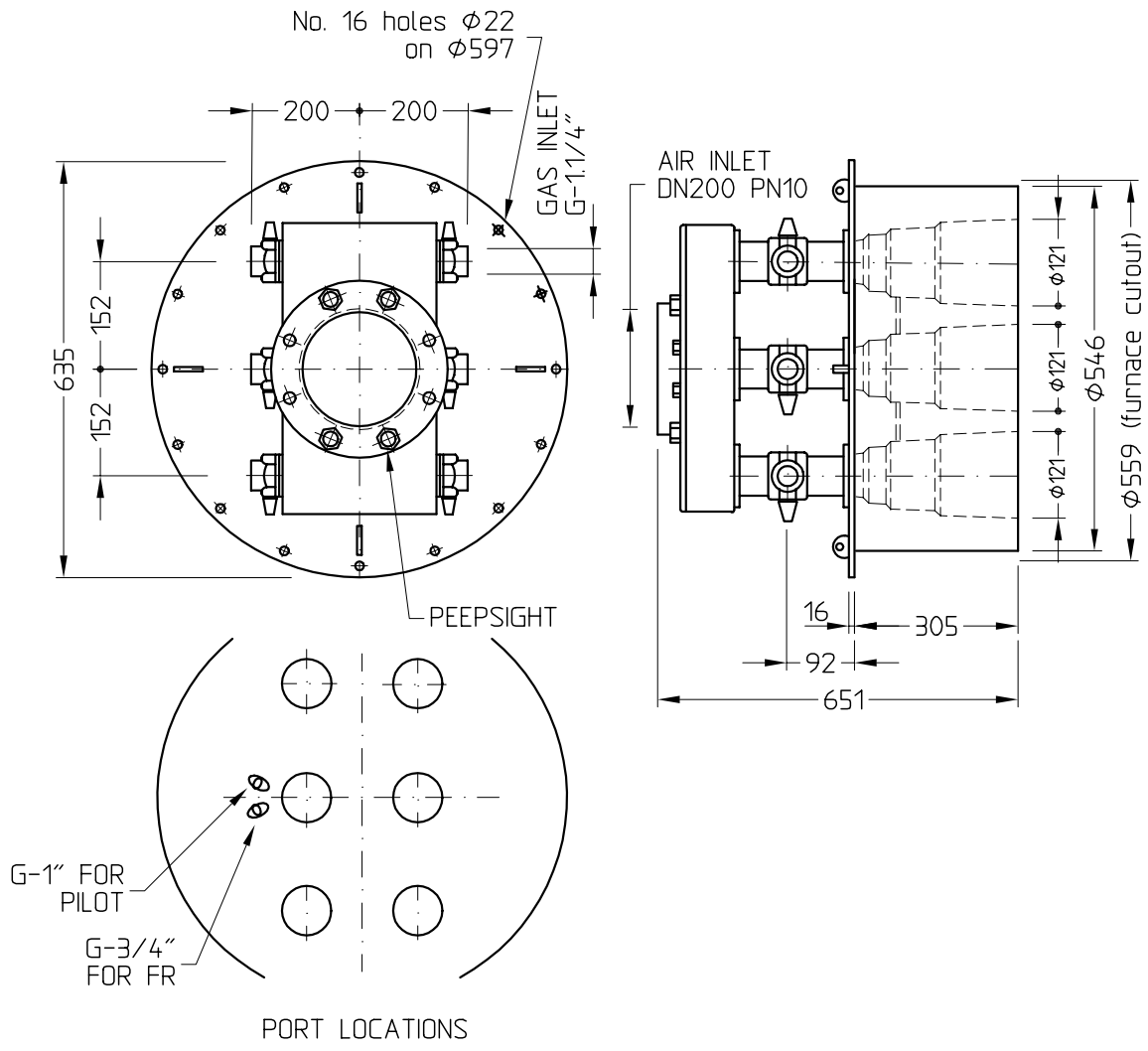
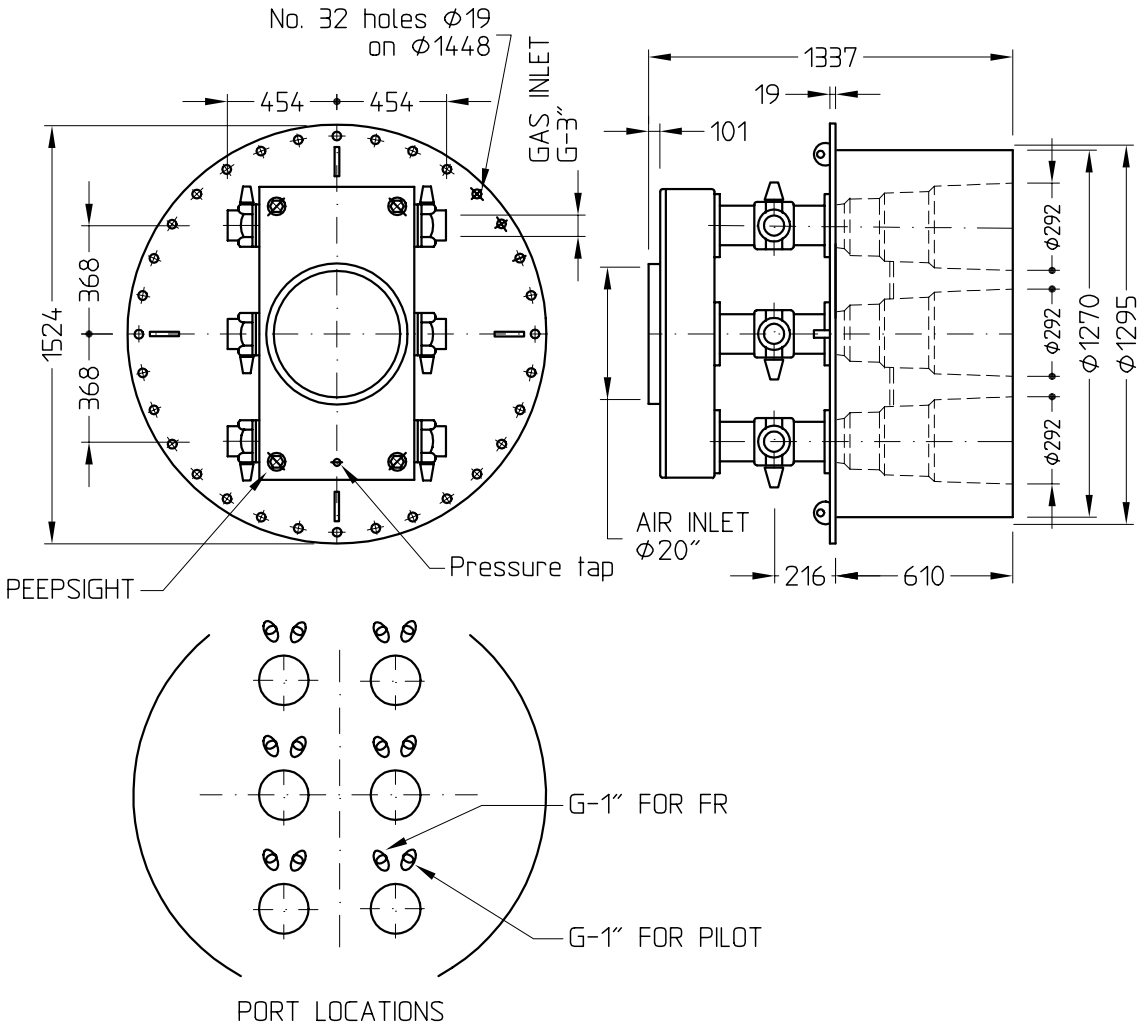


DIMENSIONS (6006 NM)



DIMENSIONS (48006 NM)



MASS

Catalog no.	Round		Square	
	Lbs	kg	Lbs	kg
101 NM	13.5	6.14	14	6.36
201 NM	—	—	21	9.55
301 NM	45.0	20.45	50	22.73
601 NM	45.0	20.45	50	22.73
1001 NM	71.0	32.27	100	45.45
2002 NM	—	—	148	67.27
4004 NM	300.0	136.36	—	—
6006 NM	520.0	236.36	—	—
1501 NM	70.0	31.82	95	43.18
2501 NM	158.0	71.82	260.0	150.0
10004 NM	885.0	402.27	—	—
4001 NM	260.0	118.18	330.0	150.0
6001 NM	330.0	150.00	—	—
8001 NM	330.0	150.00	—	—
12002 NM	1860.0	845.45	—	—
16002 NM	1860.0	845.45	—	—
18003 NM	1960.0	890.91	—	—
24003 NM	1990.0	904.55	—	—
32004 NM	2290.0	1040.91	—	—
48006 NM	2920.0	1327.27	—	—

ORDERING CODES - BURNER

		NM	–		–		–	

MODEL	
101NM	101
201NM	201
301NM	301
... (see capacity table)	.....

REFRACTORY BLOCK ALLOY JACKET	
Without alloy jacket	2
With alloy jacket	D
With short alloy jacket	SC

GAS AJUSTER	
With Gas Adjuster	GA
Without Gas Adjuster	F

REFRACTORY BLOCK	
Round block	R
Square block	S

ORDERING CODES - REFRACTORY BLOCK ONLY

		NM	–		–	BH	–	

MODEL	
101NM	101
201NM	201
301NM	301
... (see capacity table)	.....

REFRACTORY BLOCK ALLOY JACKET	
Without alloy jacket	2
With alloy jacket	D
With short alloy jacket	SC

REFRACTORY BLOCK	
Round block	R
Square block	S

NOTE: Based on the company's policy aimed at a continuous improvement on product quality, ESA-PYRONICS reserves the right to bring changes to the technical characteristics of this device without previous notice. Our catalog updated to the latest version is available on our web site www.esapyronics.com and it is possible to download modified documents

WARNING: When operating, this combustion system can be dangerous and cause harm to persons or damage to equipment. Every burner must be provided with a protection device that monitors the combustion. The installation, adjustment and maintenance operations should only be performed by trained and qualified personnel.