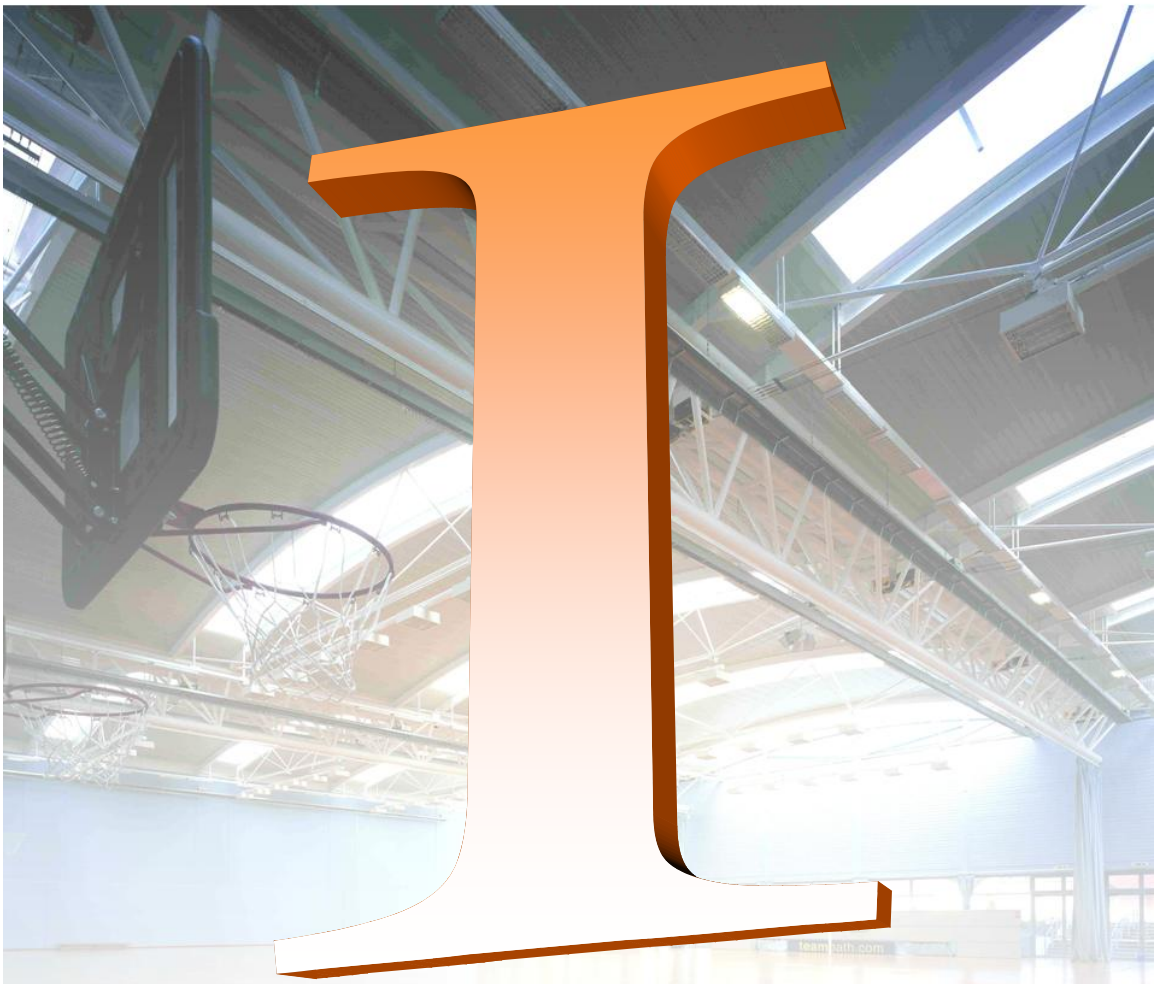
Instruction Manual

AMBIRAD

NOR-RAY-VAC CONTINUOUS

RADIANT TUBE SYSTEM

INSTALLATION INSTRUCTION MANUAL



INDEX **Section**

WARNINGS

AmbiRad equipment must be installed and maintained in accordance with the relevant provisions of the Gas Safety (Installations and Use) Regulations 1998 for gas fired products. Due account should also be taken of any obligations arising from the Health and Safety at Works Act 1974 or relevant codes of practice. In addition the installation must be carried out in accordance with the current IEE wiring regulations (BS 7671), BS 6896 (Industrial & Commercial) and any other relevant British Standards and Codes of Practice by a qualified installer. All external wiring MUST comply with the current IEE wiring regulations.

CE

Part No. 700052

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Document Index.

Introduction.

Welcome to the range of Nor-Ray-Vac 'LR' series continuous radiant tube heaters. The Nor-Ray-Vac 'LR' series system complies with the requirements of the European Gas Appliance Directive BS EN777-4. Local regulations may vary in the country of use and it is the installers responsibility to ensure that such regulations are satisfied.

All installation, assembly, commissioning and service procedures must be carried out by suitable qualified competent persons to the statutory regulations in the country of use.

When assembling, installing, commissioning and servicing is undertaken on radiant tube heaters specified in these instructions, due care and attention is required to ensure that working at height regulations are adhered to at the mounting heights specified.

***PLEASE READ** this document prior to installation to familiarise yourself with the components and tools you require at the various stages of assembly.*

All Dimensions shown are in mm unless otherwise stated.

The manufacturer reserves the right to alter specifications without prior notice.

The Ambi-Rad Nor-Ray-Vac 'LR' series direct gas fired radiant heating system comprises of a continuous system with a number of burners located in series in a radiant branch, and a number of radiant branches manifolded together, linked by a tail pipe to a vacuum fan discharging the spent products of combustion to atmosphere. A system may comprise of just one burner and one vacuum fan, to multiple burners in multiple radiant branches with one or more vacuum fans.

To enable exact matching of operational needs within an area, distances between burners and ratings of the burners can vary. The unique feature of Nor-Ray-Vac 'LR' series is a radiant system which provides uniform heat coverage of the floor area, eliminating hot/cold spots.

The tube into which the burners are mounted and over which the reflectors are fitted and emits the maximum heat is called the radiant tube. The radiant heat emitted from the hot tube is directed downwards by reflectors. The remaining interconnecting tube is called the tail pipe and radiates with less intensity.

The operating temperatures of the tubes generally range from 200°C – 480°C max.

The action of the vacuum fan is three fold; to create a high negative pressure within the radiant tube and tail pipe so as to discharge the spent products of combustion from the system to a point outside the building being heated; to control the flow of gas and air through each burner in stoichiometric proportions; to draw carrier air into the tube system at the start of each radiant branch, in order to distribute the heat from the flame along the tube.

1. Installation Requirements.

Isolate any electrical supply to the heater and controller before proceeding.

1.1 Health and Safety

AmbiRad heaters must be installed in accordance with the relevant provisions of the Gas Safety (Installations and Use) Regulations 1998.

Due account should also be taken of any obligations arising from the Health and Safety at Works Act 1974 or relevant codes of practice. In addition the installation must be carried out in accordance with the current IEE wiring regulations (BS 7671), BS 6896: (Industrial & Commercial) and any other relevant British Standards and Codes of Practice by a qualified installer. Isolate all electrical supplies to the heater & controller before proceeding.

The system is assembled at high level suspended by chains from first fixings to the roof structure.
(First fixings by others)

For your own safety we recommend the use of safety boots and leather faced gloves when handling sharp or heavy items. The use of protective eye wear is also recommended.

1.2 Burner Model Definitions

NRVxxLR-EV = Nor-Ray-Vac continuous radiant tube heater only for use with branch end configurations.
NRVxxLR-IL = Nor-Ray-Vac continuous radiant tube heater only for use with in-line configurations.

xx denotes kW rating. Models available; 12, 18, 24, 32, 38 and 46

1.3 Heater Suspension

1.3.1 First considerations

- Clearances from combustibles must be maintained. (See figure 2)
- For ease of servicing there should be a minimum clearance distance of 500mm between the burners of the heating system and the building wall. This measurement can be reduced for perimeter type systems. (See figure 1a).
- For ease of servicing and burner removal minimum clearances should be maintained. (See figure 1b and 1c). In exceptional circumstances the burner lid may be slid diagonally for removal thus reducing the vertical distance.
- Ensure that the suspension is sufficiently flexible to allow for thermal expansion.

1.3.2 Suspending the heater - General

1.3.2.1 The first support is always positioned at the support lug suspension point on the end vent burner combustion chamber.

1.3.2.2 Subsequent supports are placed approximately 2.8m apart, including one at each combustion chamber location. This gives a maximum load per support of 24kg.

1.3.2.3 A support must always be located at a maximum distance of 2m from a tee or elbow fitting.

1.3.2.4 Except for the combustion chamber support lug suspension points, suspension support brackets are installed to support the tube section which is then covered with reflectors.

1.3.2.5 Tail pipe hangers are installed for the tube section which will be without reflectors.

If there are any doubts as to the strength or suitability of roof steelwork to which heaters are to be suspended, please refer to a Consultant, Architect or owner of the building.

Table 1. Minimum mounting heights

Model	Minimum Mounting Heights (m)
NRV12LR	3.0m
NRV18LR	3.6m
NRV24LR	4.0m
NRV32LR	4.7m
NRV38LR	5.3m
NRV46LR	6.0m

Figure 1.a Overall Dimensions

A - Burner Tube
B - LR Burner
C - Optional Perimeter Reflector
D - Wall

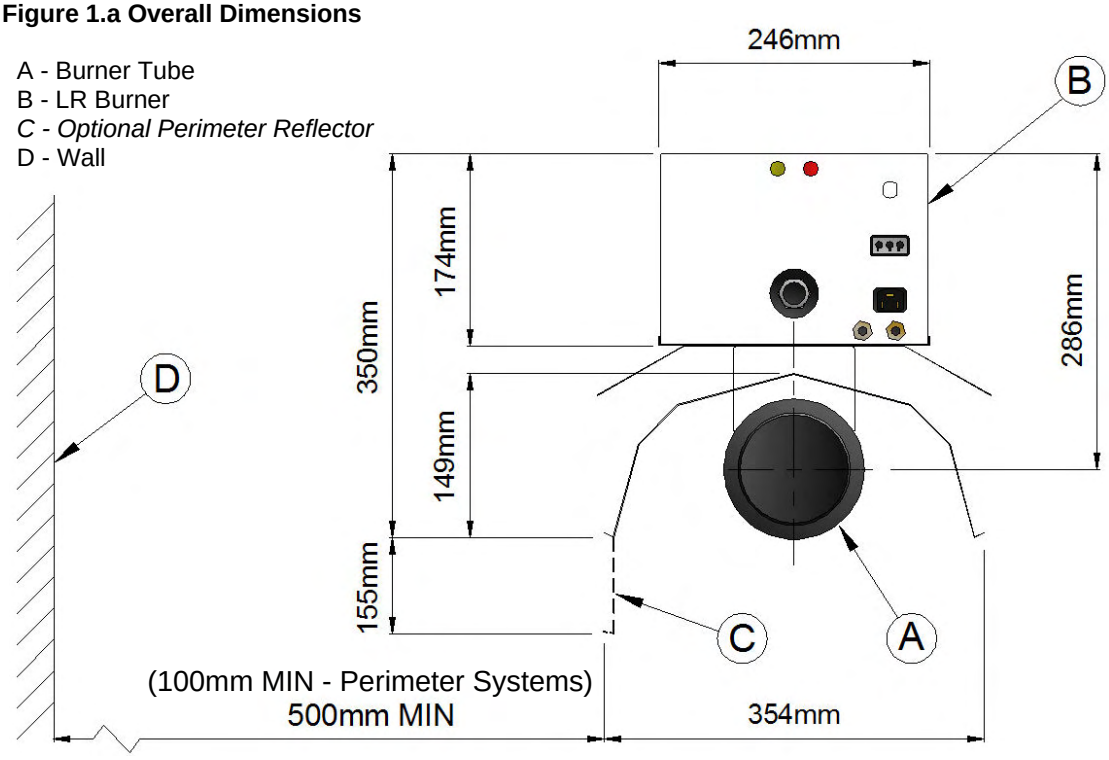


Figure 1.b Clearance for servicing - distances to walls and obstacles above.

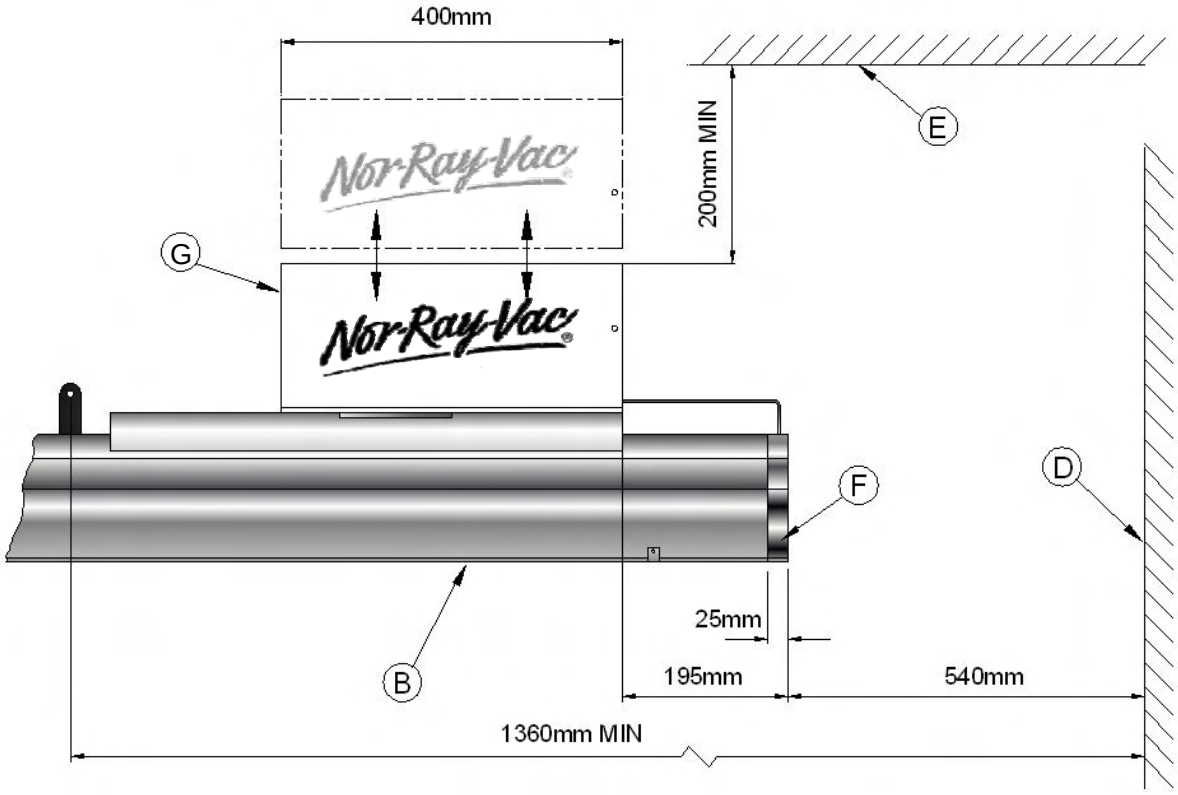
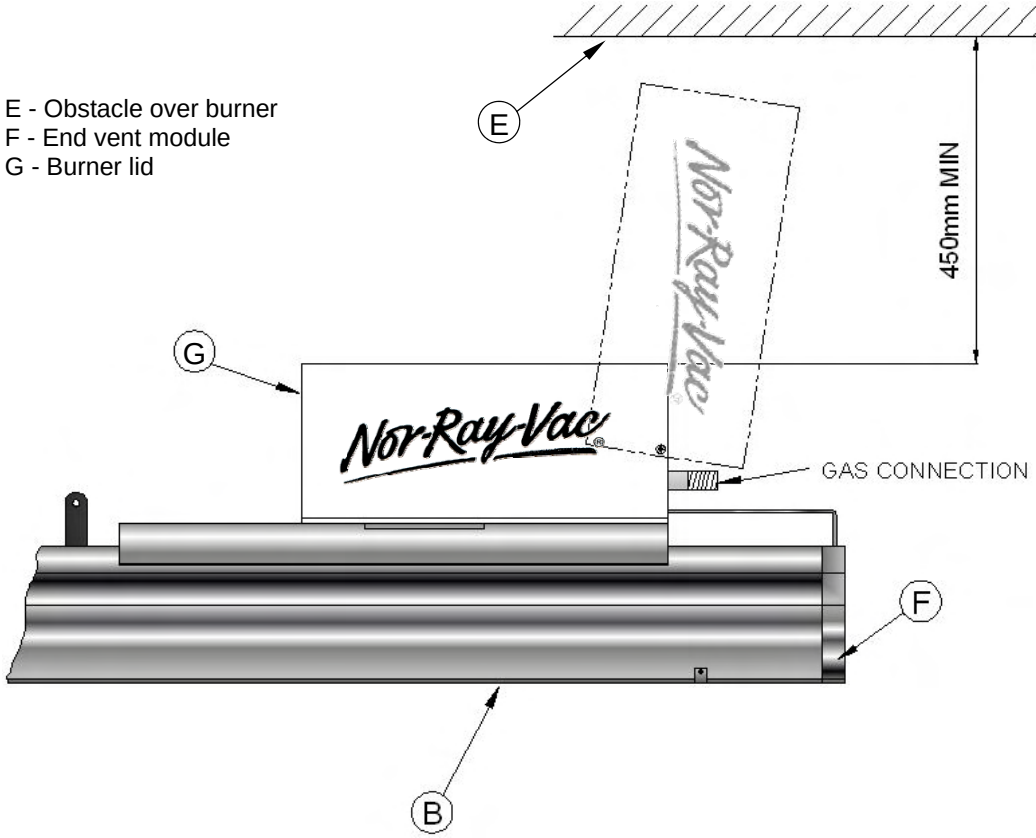


Figure 1.c Clearance for servicing - distances to obstacles above.

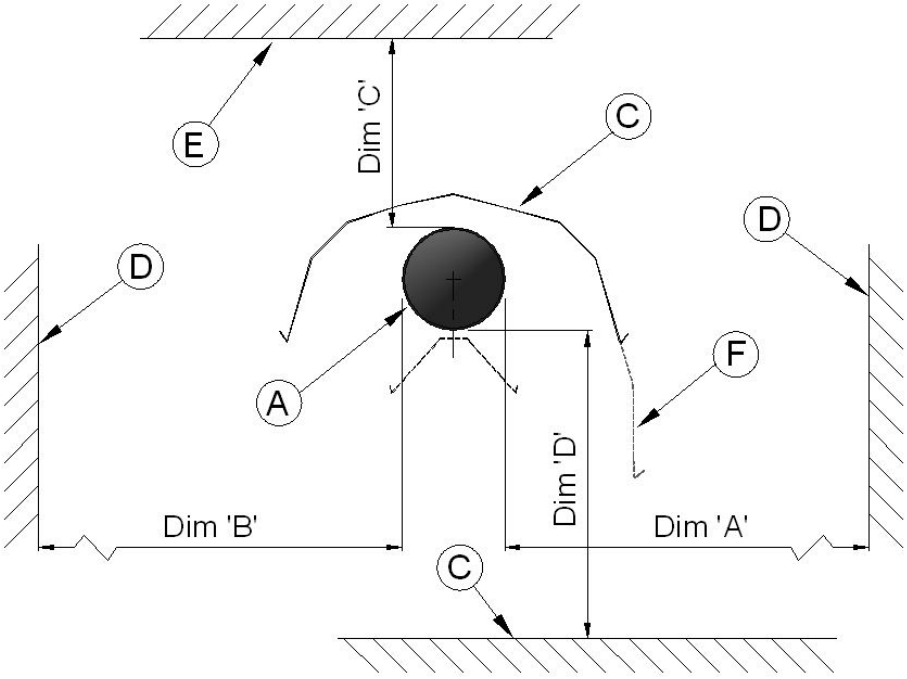
E - Obstacle over burner
F - End vent module
G - Burner lid



1.4 Clearance to Combustibles.

The minimum clearances to combustible materials are given in table 2 below. These minimum distances MUST be adhered to at all times.

Figure 2 Diagram illustrating the clearance to combustibles



Distance from combustibles (distance from heat source that will produce a 50ºC rise in temperature above ambient of a black surface) **A** Radiant tube; **B** Standard reflector; **C** Combustible material underneath; D Combustible material on side; **E** Combustible material above; **F** Perimeter reflector;

Table 2

Burner Model		**NRV12LR**		**NRV18LR**		**NRV24LR**	
		End vent	In-line	End vent	In-line	End vent	In-line
Below tube							
Dim **D** Without undershield	mm	1120	1250	1120	1250	1120	1250
Dim **D** With undershield	mm	760	850	760	850	760	850
Dim **C** Above Tube	mm	250					
Horizontally							
Dim **B** Standard reflector	mm	600	770	600	770	600	770
Dim **A** Perimeter reflector	mm	305	450	305	450	305	450
Burner Model		**NRV32LR**		**NRV38LR**		**NRV46LR**	
		End vent	In-line	End vent	In-line	End vent	
Below tube							
Dim **D** Without undershield	mm	1440	1700	1570	2100	1700	2100
Dim **D** With undershield	mm	760	850	785	1050	850	1050
Dim **C** Above Tube	mm	250					
Horizontally							
Dim **B** Standard reflector	mm	700	850	700	1000	700	1000
Dim **A** Perimeter reflector	mm	305	510	305	600	305	600

1.5 Gas Connection and Supply

Before installation, check that the local distribution conditions, nature of gas and pressure, and adjustment of the appliance are compatible.

A competent or qualified engineer is required to either install a new gas meter to the service pipe or to check that the existing meter is adequate to deal with the rate of gas supply required.

Installation pipes should be fitted in accordance with BS 6896, so that the supply pressure, as stated in Table 3 will be achieved. It is the responsibility of the competent engineer to ensure that other relevant Standards and Codes of Practice are complied with in the country of installation.

Pipes of smaller size than the heater inlet gas connection must not be used. The complete installation must be tested for soundness as described in the country of installation.

The gas union service cock MUST be fitted in the gas supply close to the heater, but not onto the burner itself.

Take care when making a gas connection to the heater not to apply excessive turning force to the internal controls.

A flexible hose is installed to allow safe linear expansion to each burner without creating undue stress on the gas supply pipe work. It is therefore important that a tested and certified hose assembly made to ISO 10380, supplied with ½" BSP female cone seat adapters, is installed as per these instructions.

It is also important to ensure that expansion is taken up in the body of the flexible hose, and not on its attachment to the pipe work.

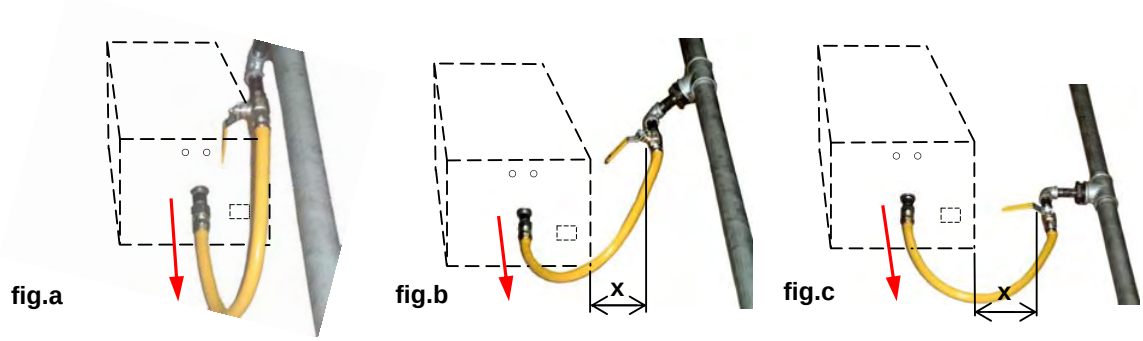
The cone seat adapter supplied on one end of the flexible gas hose provides a `swivel` action, and must be fitted on the burner using a ½" BSP barrel nipple to provide ease of disconnection for future servicing.

The installation layout described below is the only method recommended by the institute of gas engineers, the hose manufacturer, and AmbiRad and must only be carried out by a qualified/competent gas engineer.

Table 3 Gas Supply Pressures

Gas Category	G20	G25	G30	G31
Gas Type	Natural Gas	Natural Gas	Butane	Propane
Max Supply Pressure (mbar)	50	50	35	57.5
Min Supply Pressure (mbar)	17.5	20	20	25
Nominal Pressure (mbar)	20	25	29	37
Gas Supply	Connection R½ ½in BSP Internal Thread			

Figure 3. Correct Installation of Flexible Gas Connection



Depending on the specific installation, the flexible gas hose may be routed to the gas cock at any of the following angles in relation to the burner:

Vertical (fig.a)
45° angle (fig.b)
90° angle (fig.c)

Any other position in between these angles is acceptable.

Arrow denotes direction of expansion.

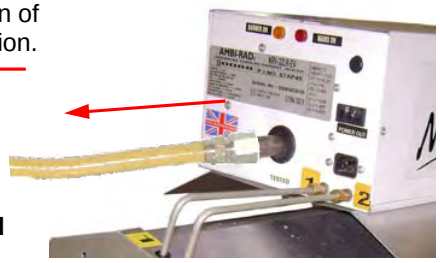


fig.d

Care must be taken to observe the minimum pipe bend diameter (minimum 250mm, maximum 350mm) & pipe expansion distance (minimum 30mm, maximum 70mm) as shown in fig.e.

Maximum bend diameter for the hose is 450mm.

The correct installation as shown will allow for approx 100mm of movement due to expansion.

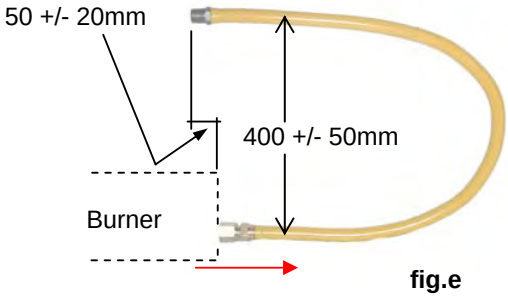


fig.e

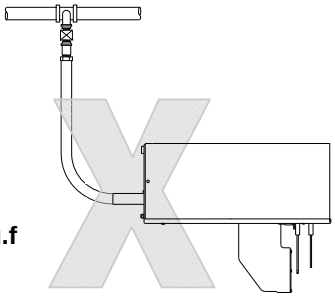


fig.f

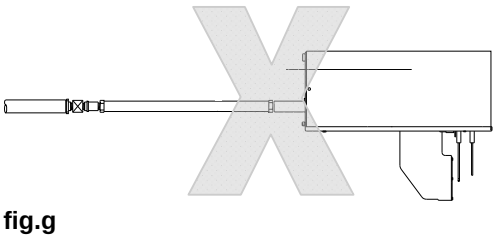


fig.g

The methods shown in fig.f and fig.g are unacceptable, due to undue stress on the hose & fittings.

1.6 Electrical Connections

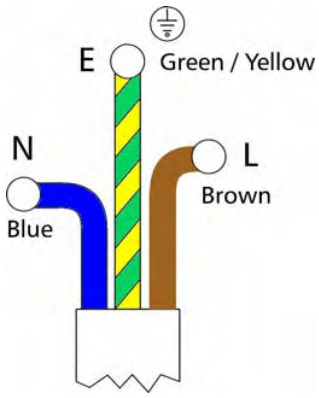
Standard burner 16W.
Current rating 0.05 amp per burner
Fuse: external 3 amp.

Each component carrying an electrical supply must be earthed.
Supply for burners is 230V 50Hz single phase.
* Exhaust fans are three phase 415V 50Hz.
* IP54 rated Inverter panel LRU's require a 230V single phase supply at 22A (B80/ B160) or 30A (B300)
* Standard LRU's require a 415V three phase supply at 25A (BH300)
** refer to individual site specifications*

All electrical work should be carried out to IEE standards by a competent electrician.

The electrical connection to the burner is made by means of a three pin plug-in power connector. Live, neutral and earth connections should be made via a flexible supply cable to the power connector and routed clear of the heater or tubes.

The flexible supply cables to each burner



should be of 0.5mm² minimum and comply with BS 6500. For fan and LRU supply, the wire size must be suitable for the current ratings as listed in Table 10.

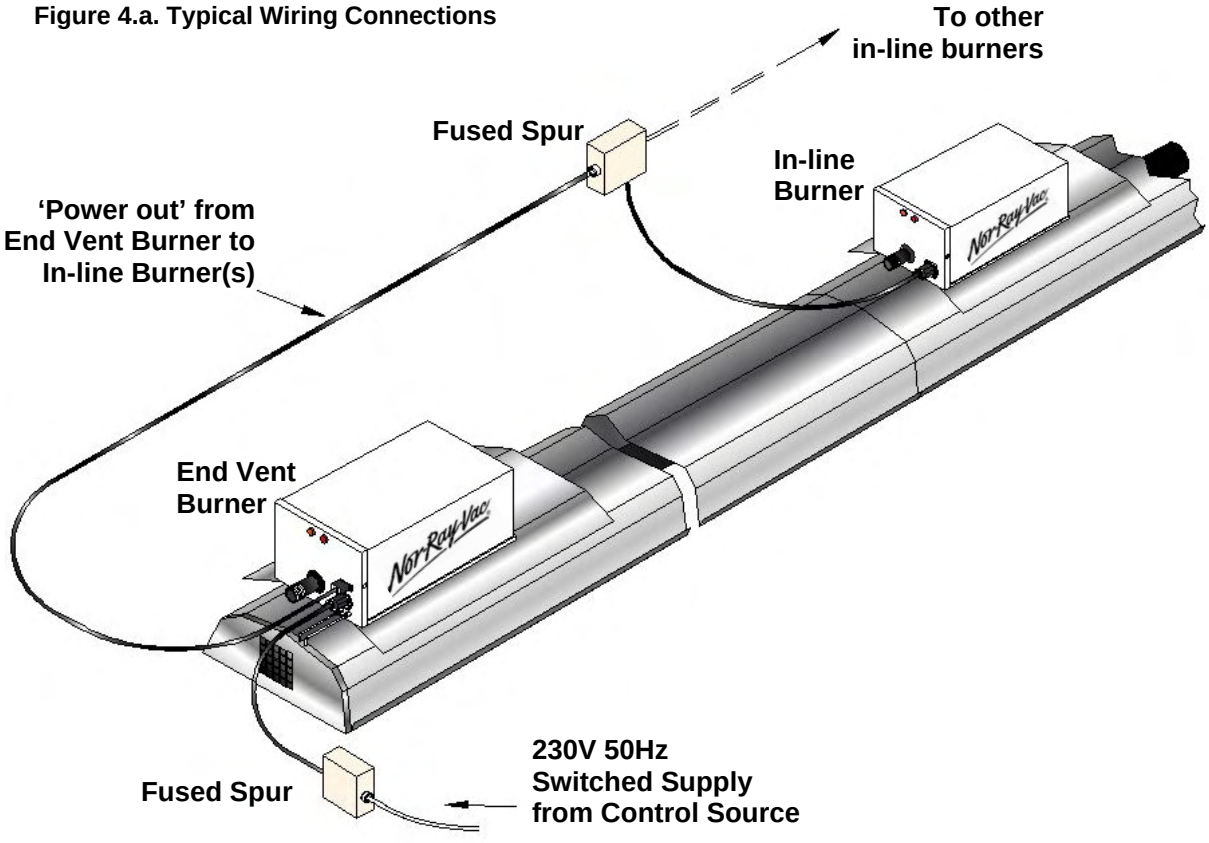
The wires in the mains lead are coloured in accordance with the following code: Green & Yellow Earth; Blue Neutral; Brown Live

The method of connection to the electrical supply must facilitate complete isolation and should be via a fused double pole isolator having contact separation of at least 3mm on all poles and supplying the appliance only.

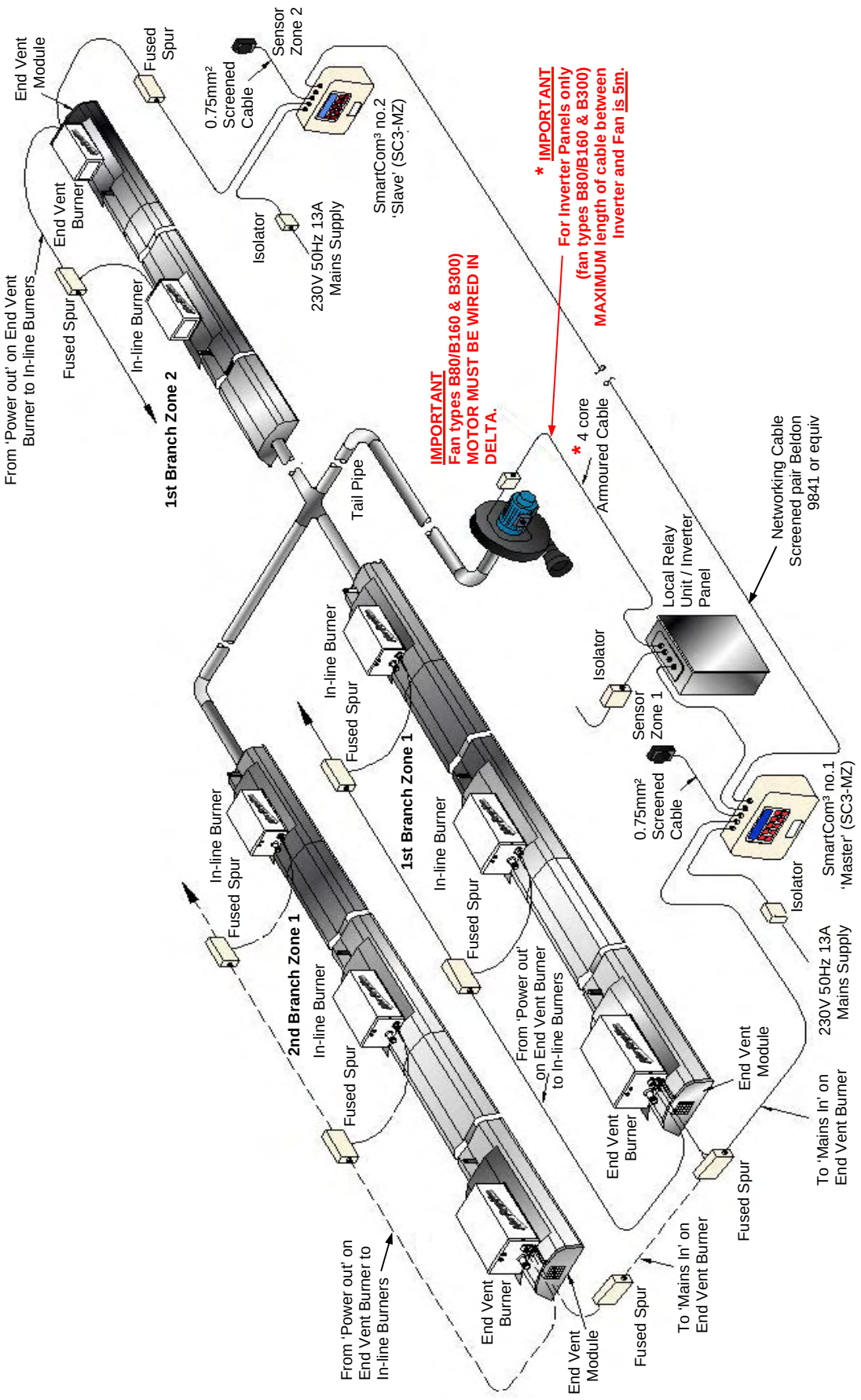
We recommend use of AmbiRad approved controls. Please refer to; SmartCom control manual for siting and installation details and figures 4.l and 4.m

Where alternative controls are used, please refer to the manufactures instructions for their siting and installation details.

Figure 4.a. Typical Wiring Connections



1.6.1 NRV LR system - Typical External Diagram



1.6.2 Wiring Details

Figure 4.c. LR internal wiring diagram - End Vent Burner (EV)

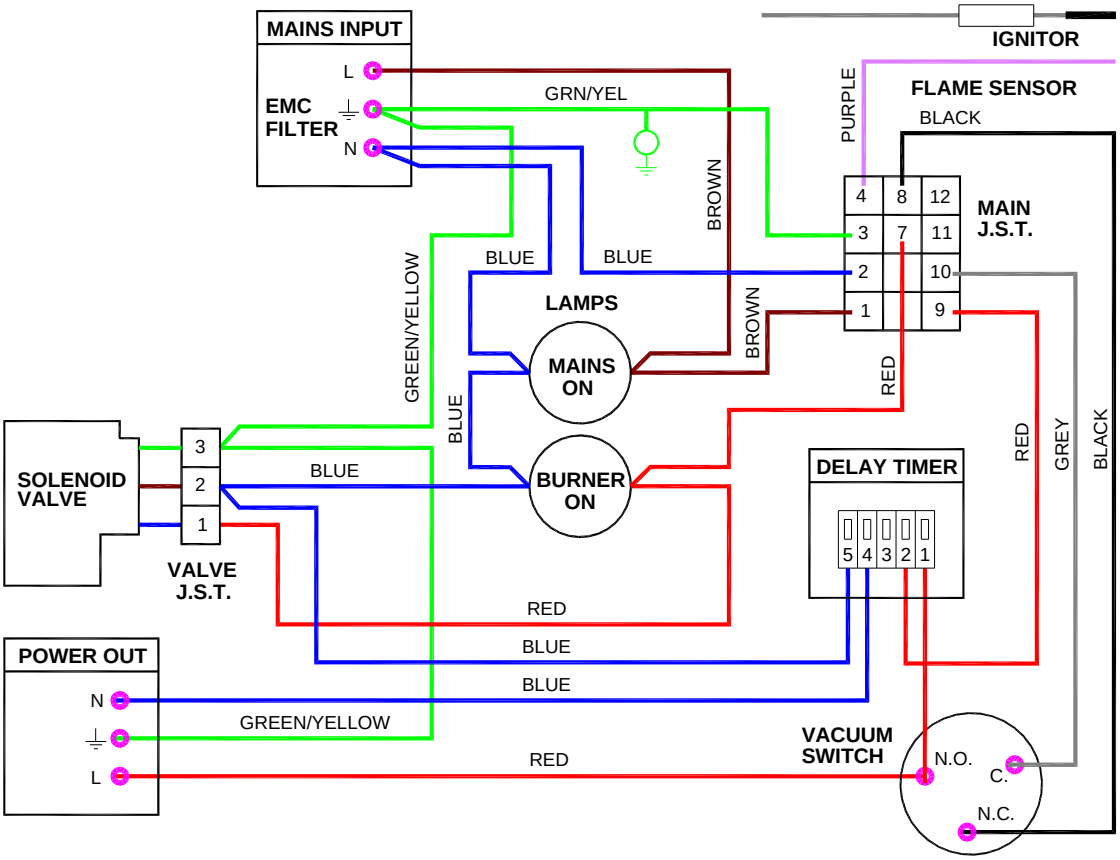


Figure 4.d. LR internal wiring diagram - In-line Burner (IL)

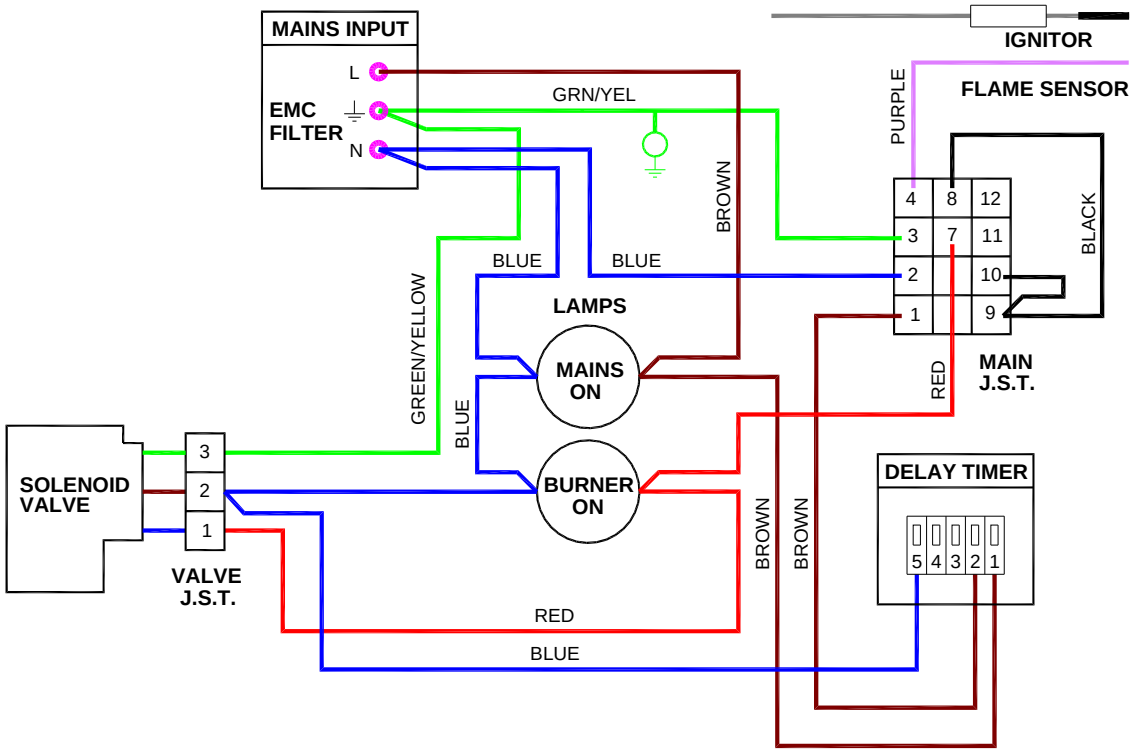


Figure 4.e. LR internal wiring diagram - End Vent Burner c/w N/O or N/C volt free Lockout contacts

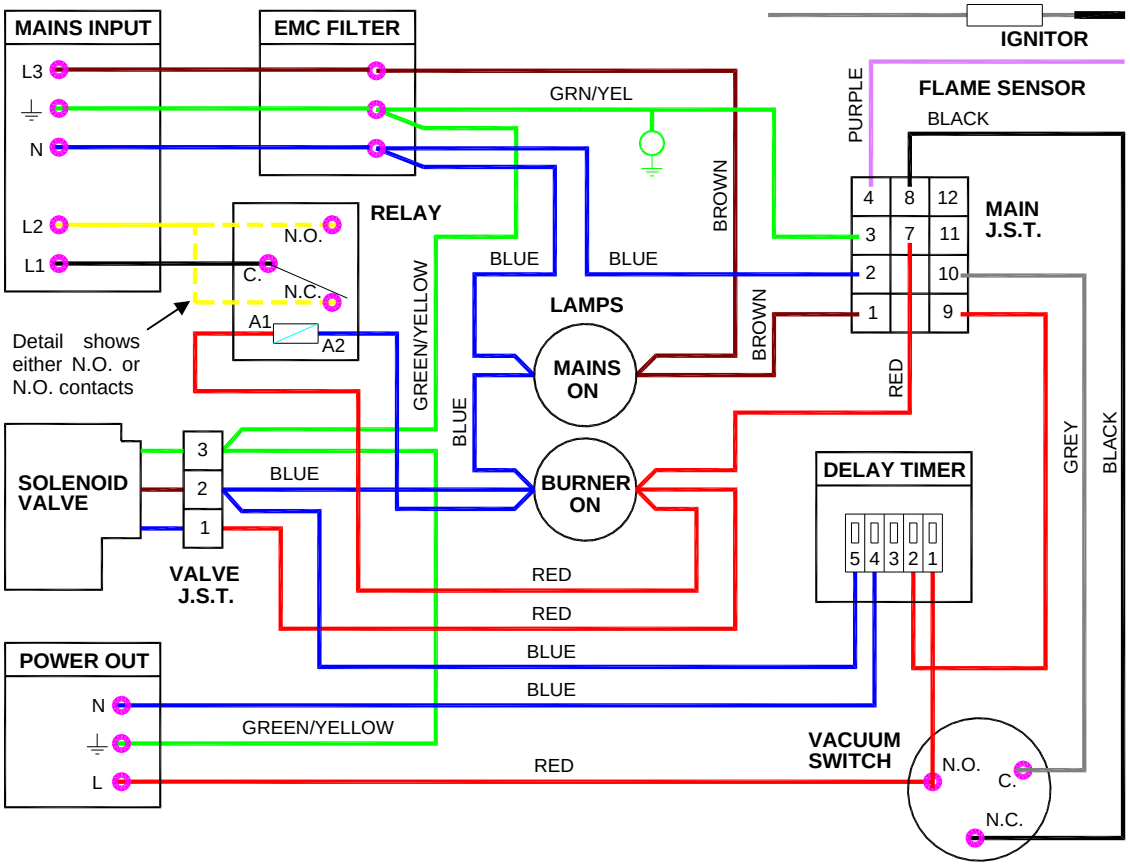


Figure 4.f. LR internal wiring diagram - In-line Burner c/w N/O or N/C volt free Lockout contacts

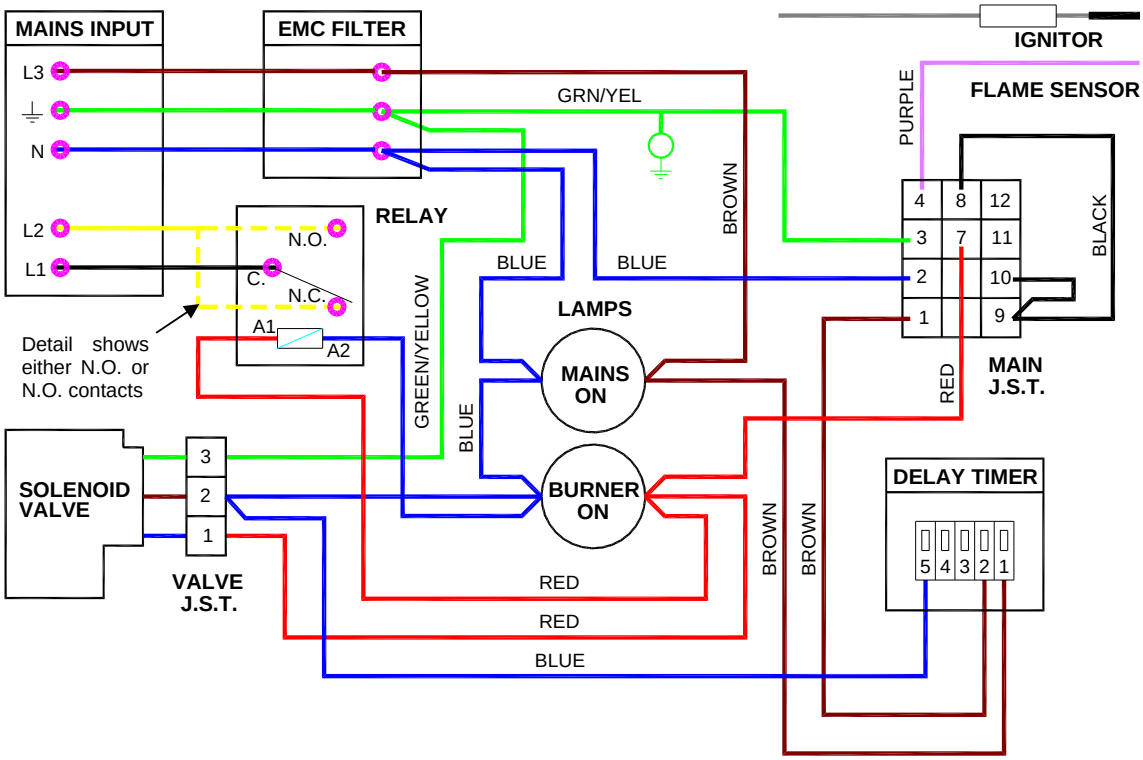


Figure 4.g. LR internal wiring diagram - End Vent Burner c/w 3 way solenoid valve

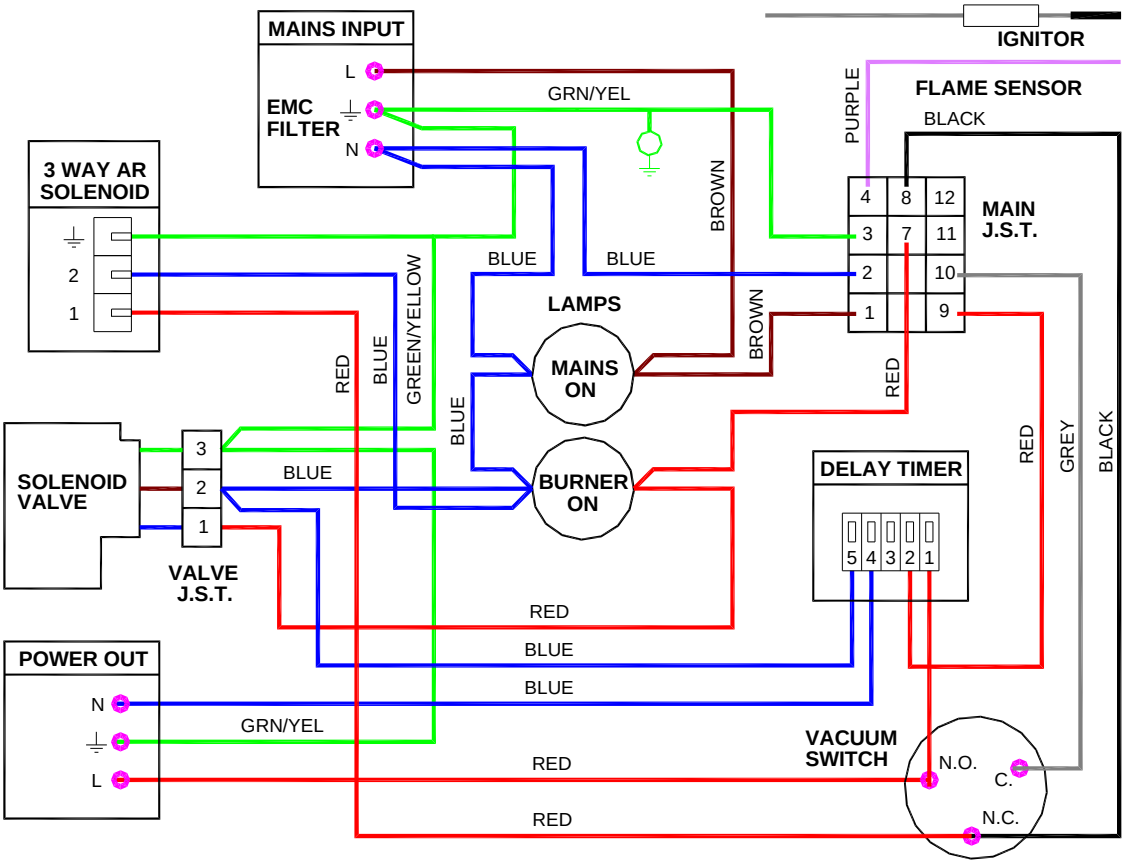


Figure 4.h. LR internal wiring diagram - End Vent Burner c/w valve & N/O or N/C VF Lockout contacts

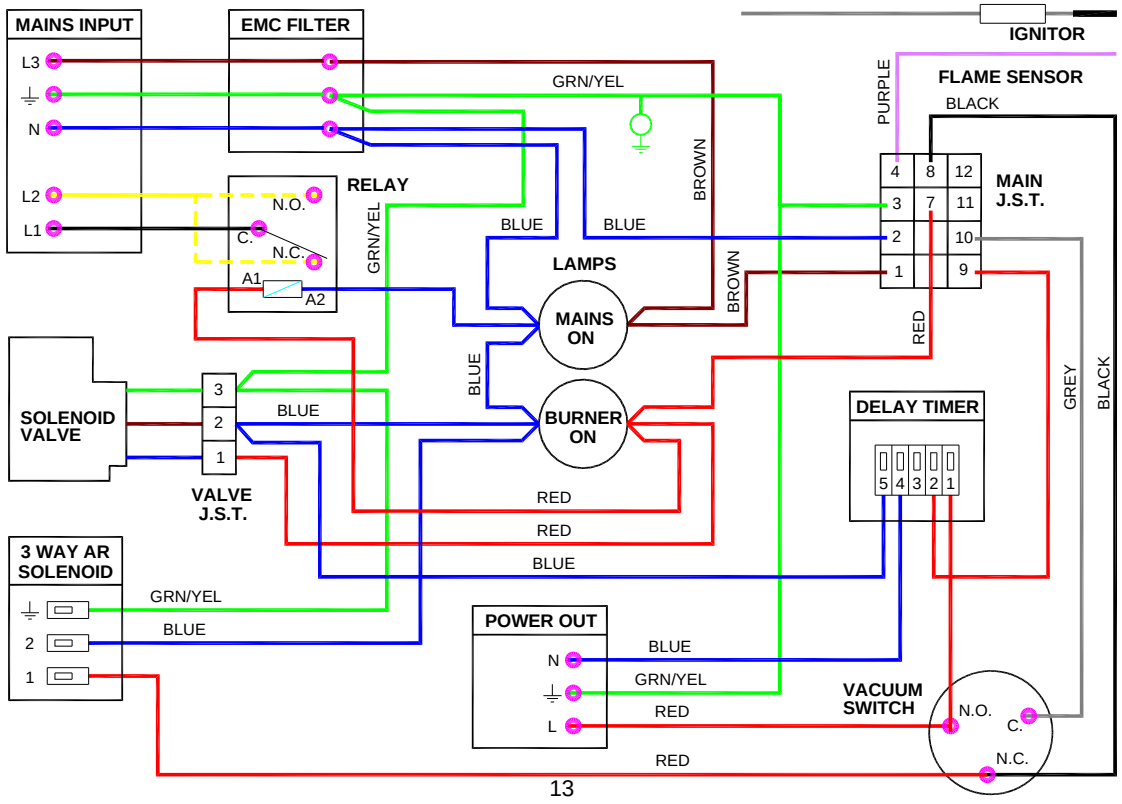


Figure 4.j. NRV Inverter Internal Wiring Diagram for B80, B160 and B300 three phase fans

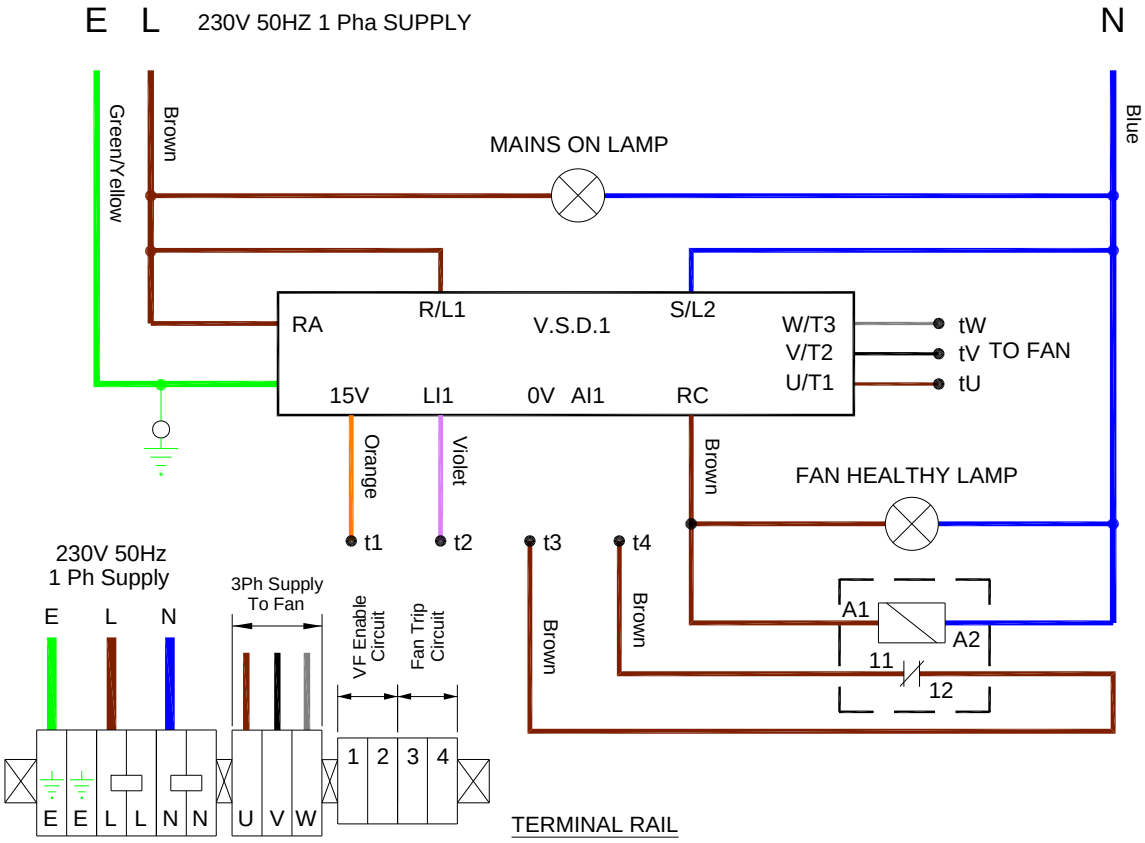


Figure 4.k. NRV Local Relay Unit Internal Wiring Diagram for BH300 three phase fans

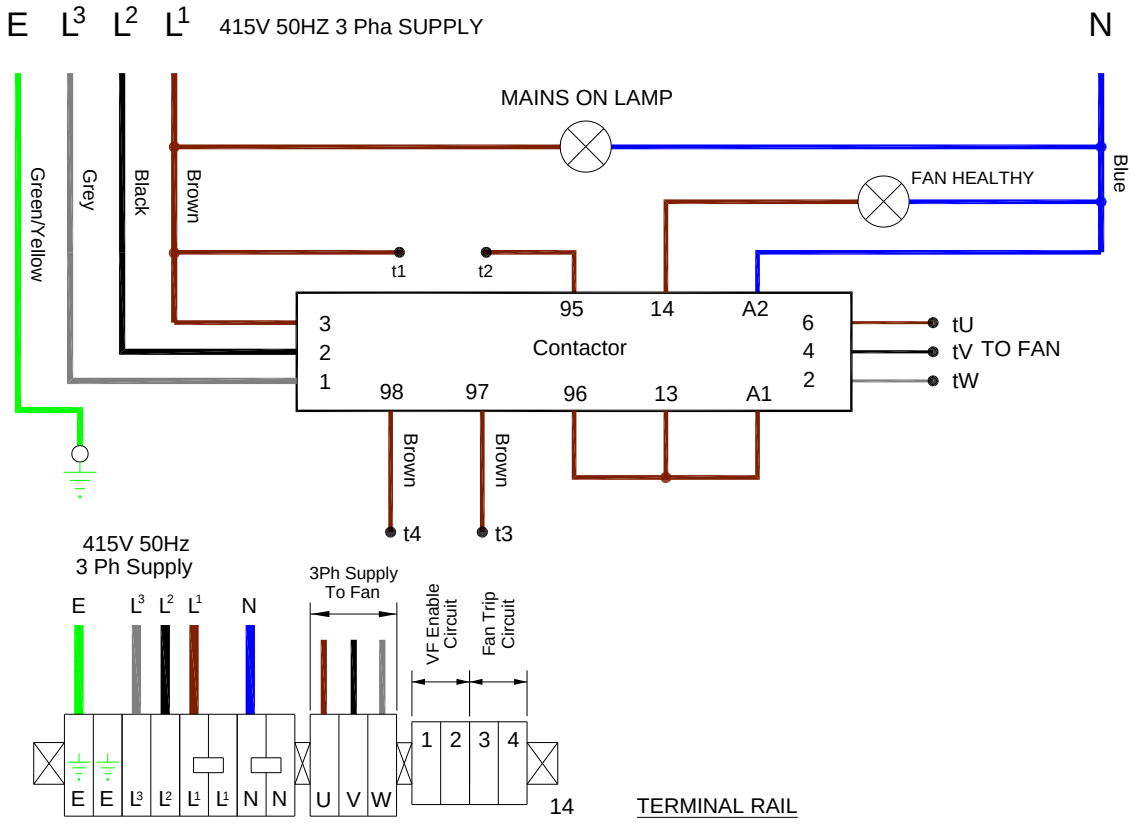


Figure 4.I. NRV Schematic interconnecting wiring. B80, B160 and B300 three phase fans controlled by SmartCom3 via single phase Inverter panel. (single zone shown)

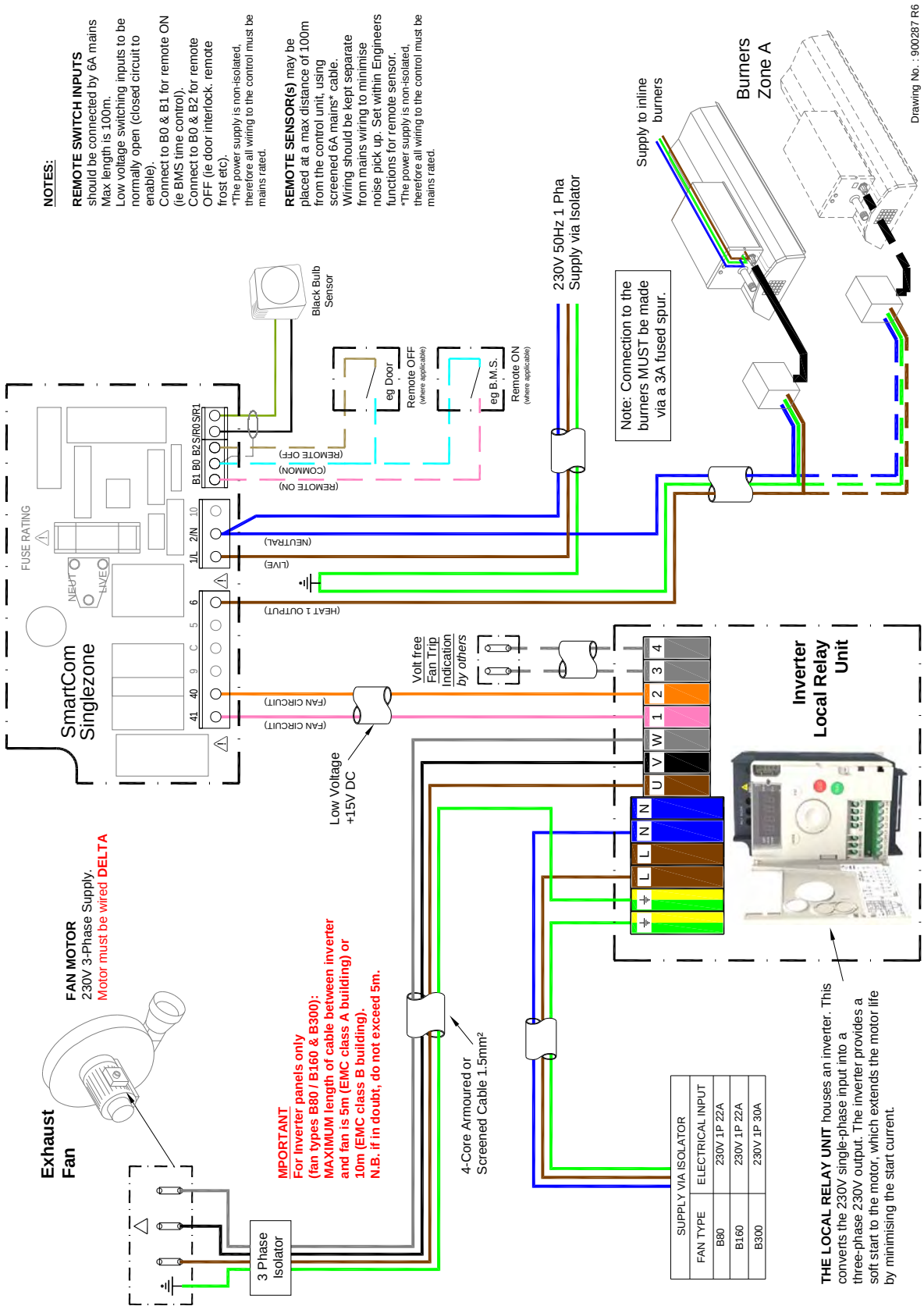


Figure 4.m. NRV Schematic interconnecting wiring. BH300 three phase fans controlled by SmartCom3 via three phase Local Relay panel. (single zone shown)

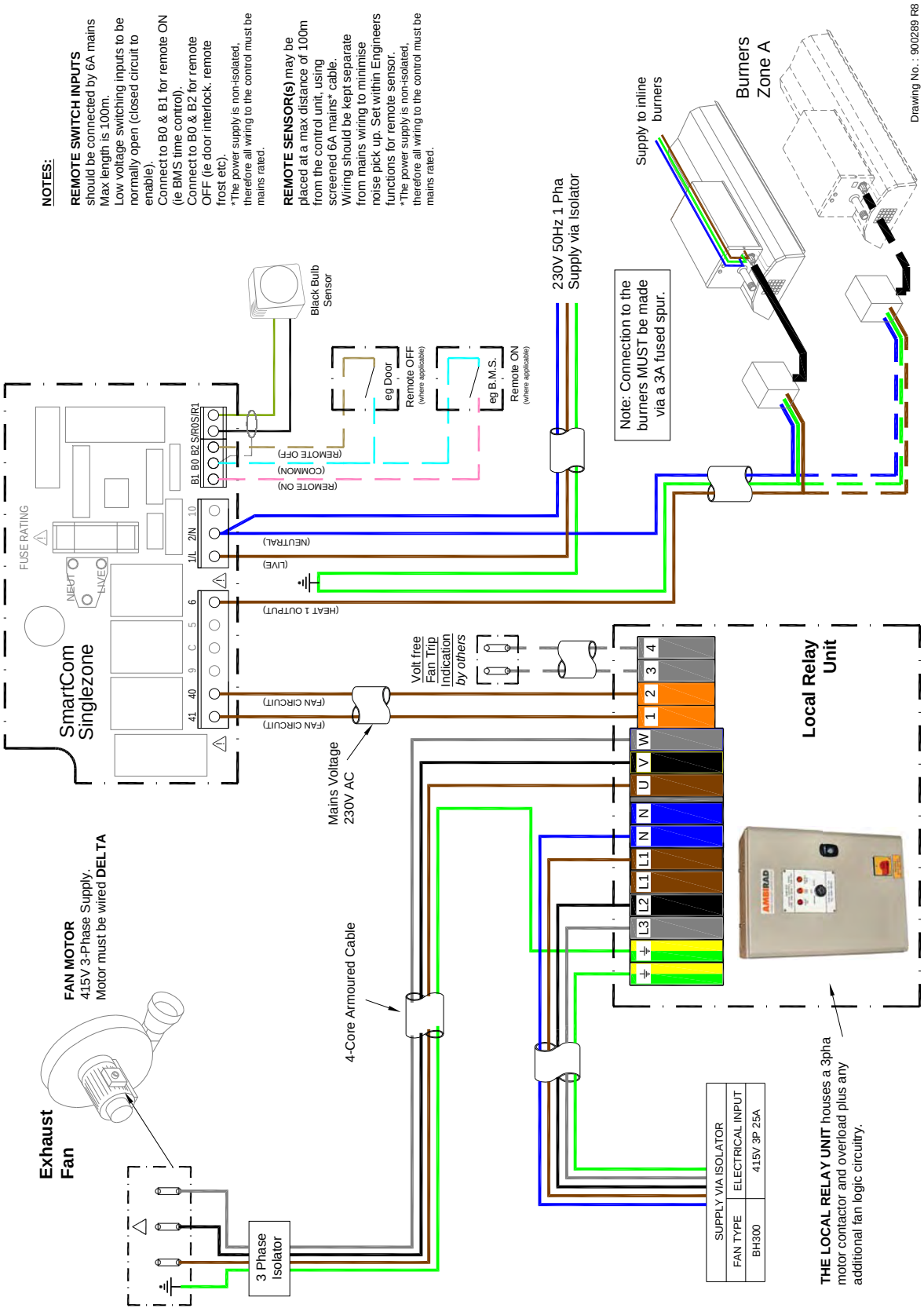


Figure 4.n. NRV Schematic interconnecting wiring. B80, B160 and B300 three phase fans controlled by SmartCom3 via single phase Inverter panel. Zonal BMS Lockout and VF interface.

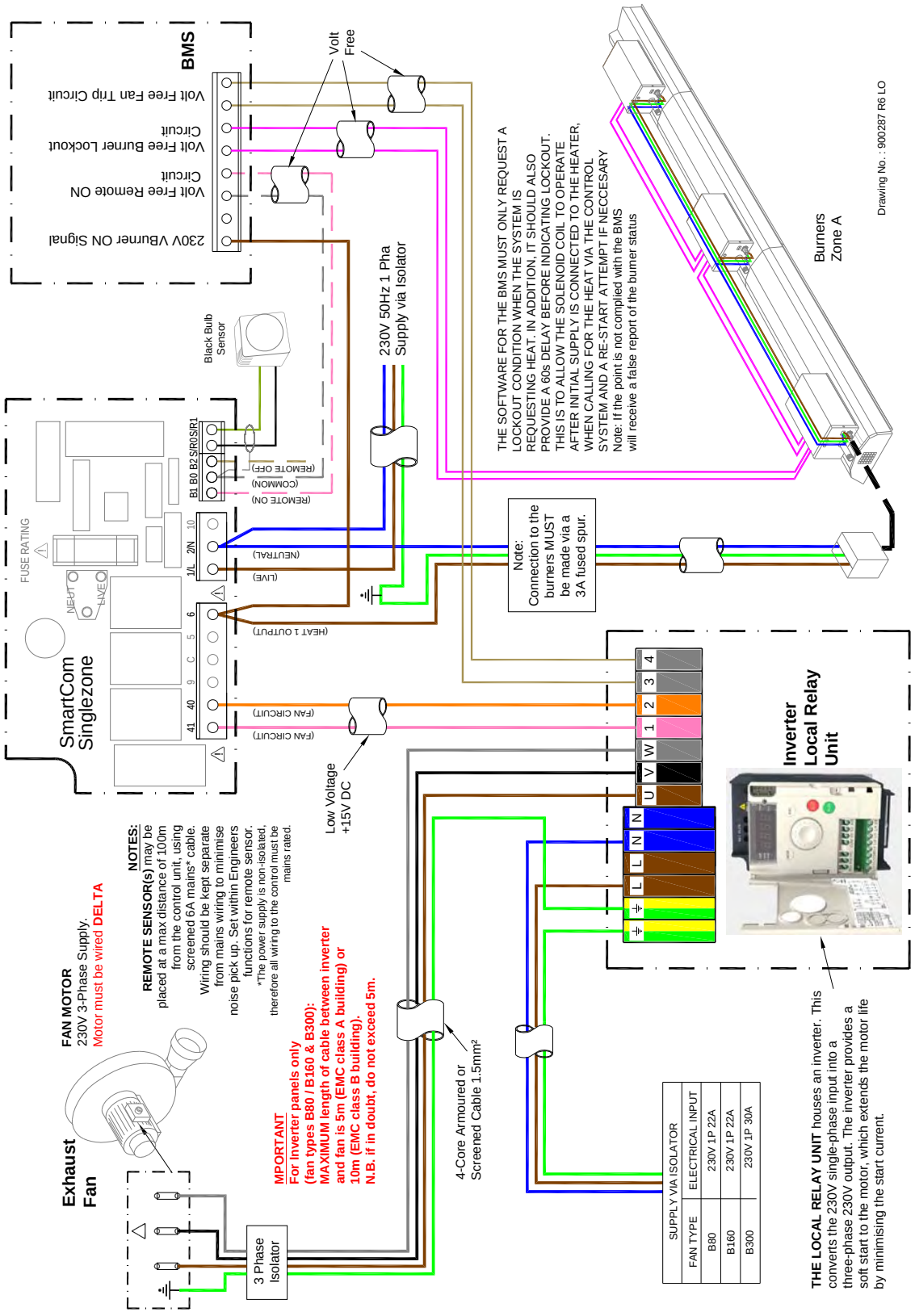
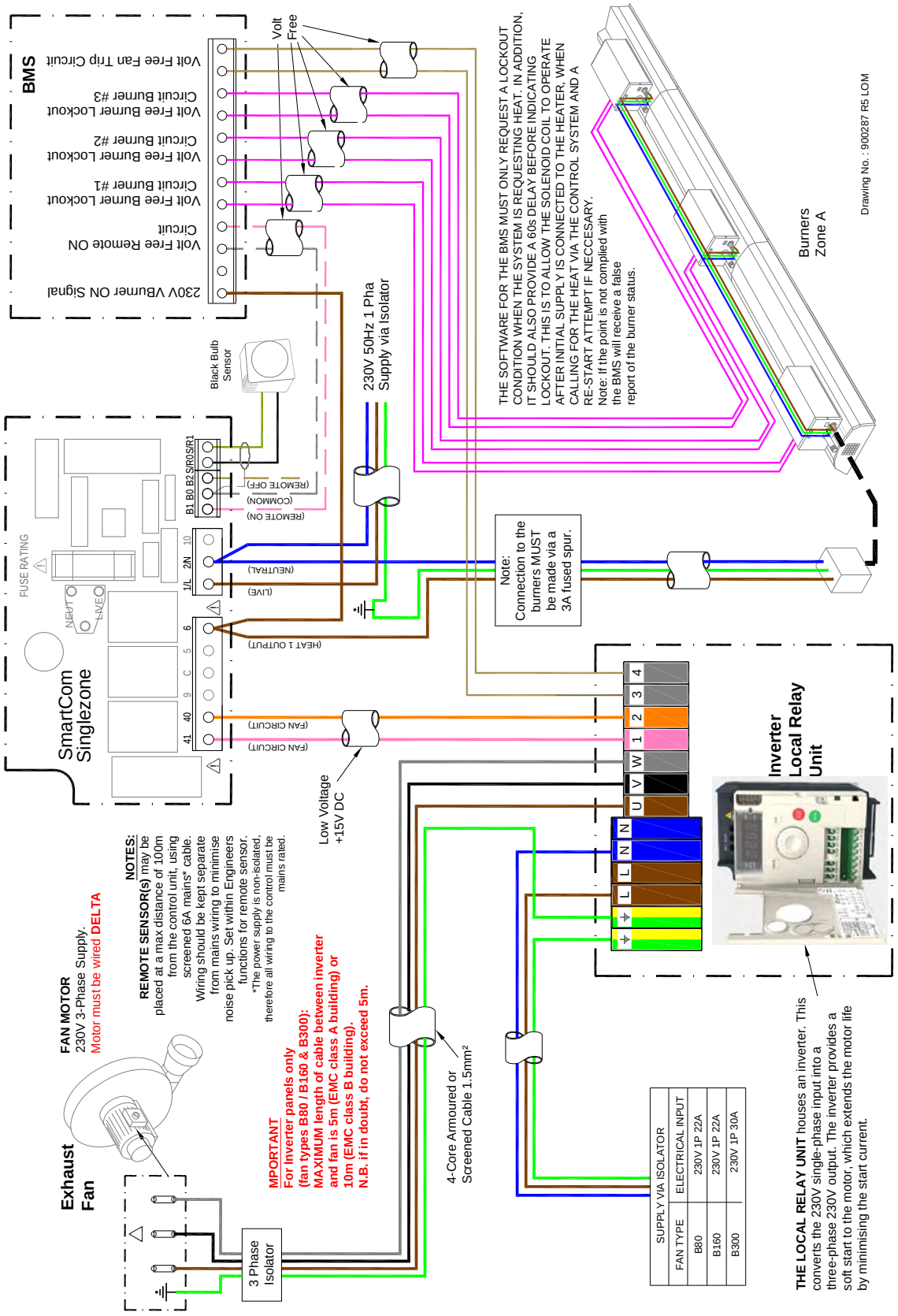


Figure 4.p. NRV Schematic interconnecting wiring. B80, B160 and B300 three phase fans controlled by SmartCom3 via Inverter panel. Individual BMS burner Lockout and VF interface.



1.7 Ventilation Requirements

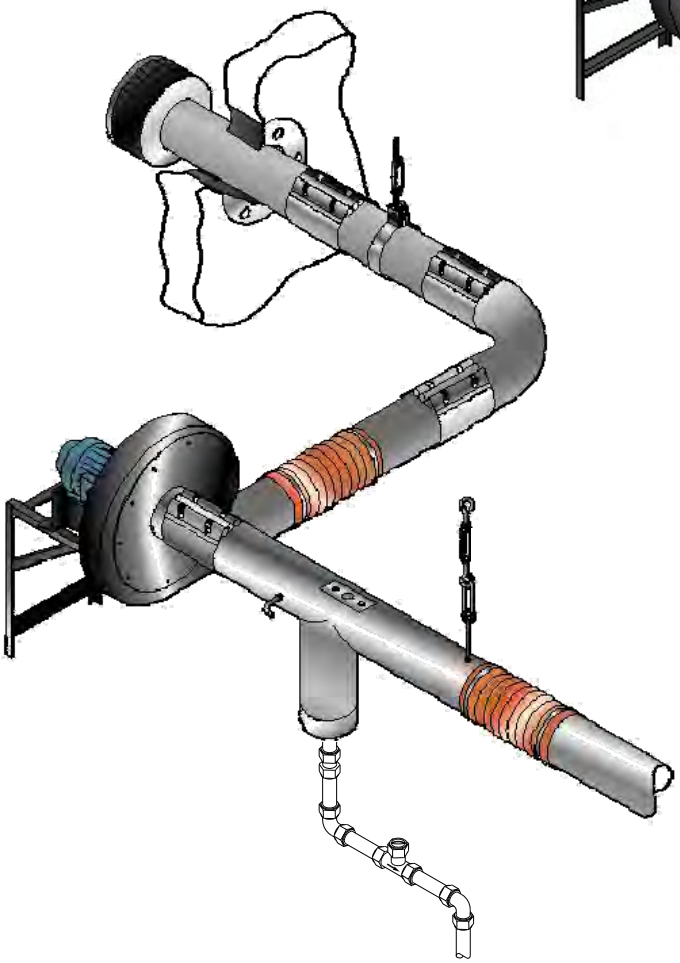
Nor-Ray-Vac heaters are installed as flued appliances in accordance with the relevant national requirements in the country of installation.

In buildings having an air change rate of less than 0.5 per hour, additional ventilation is required. For detailed information, please see BS6896 section 5.2.2.2.1

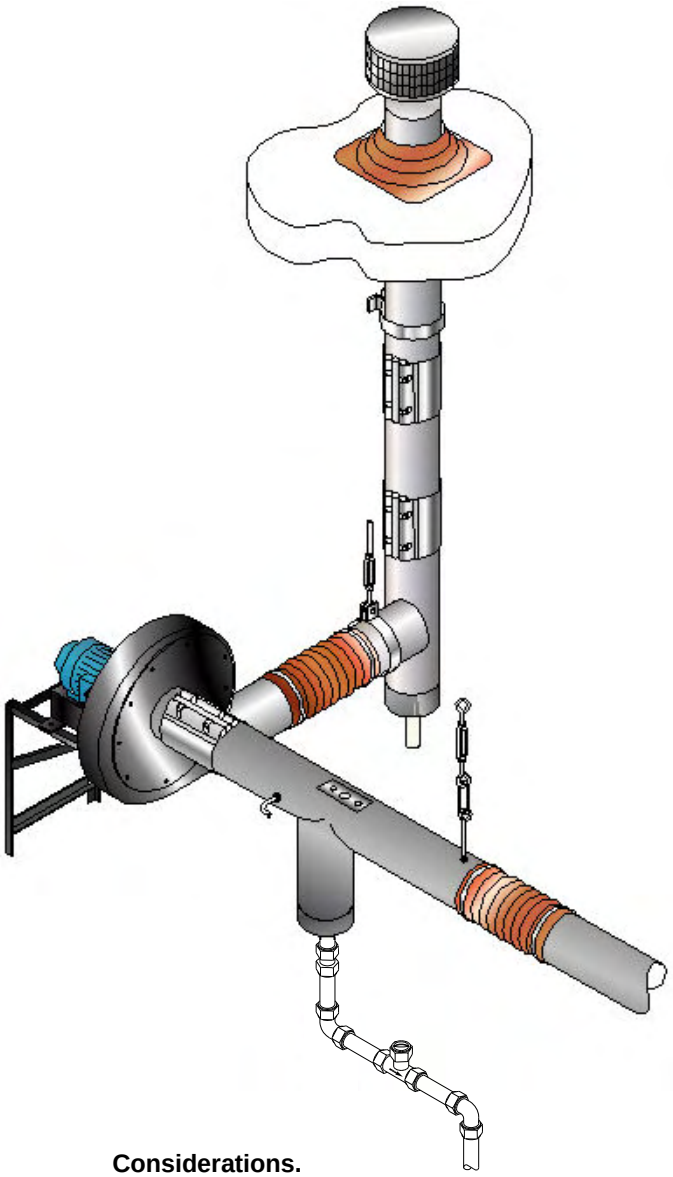
Natural Ventilation
Low level ventilation openings with a free area of at least 2cm²/kW shall be provided. See BS6896 section 5.2.2.2.2.1.

1.8 Exhaust and Air Inlet - Options

1.8.1 Horizontal discharge



1.8.2 Vertical discharge



Considerations.

The vacuum fan must be located as shown in the layout drawing.

The vacuum fan must have a bottom horizontal discharge.

The fan should be fitted to the mounting platform which is fixed to the wall or building structure. Alternatively, the fan can be suspended from the roof structure, via drop rods (not supplied) and mounted on base frame. (Anti-vibration mountings are fitted between the fan and the mounting platform/base frame.

For full details of parts and installation, please refer to section 2.9.3

1.8.3 Ducted Air Inlet Considerations.

Heat resistant flexible tube is connected to the burner assembly ducted air adaptor and the EVM ducted air adaptor and connected to the air supply duct

The maximum length of 100mm diameter ductwork is 2m.

Ensure that the flexible supply duct does not drape over or touch the reflector.

Ensure that the flexible ductwork is installed to allow for expansion of the heating system.

On a header duct, the main air supply header which is feeding the individual branch ducts and burner/end vent supply ducts must have a maximum pressure drop of 0.25 mbar (0.1in wg).

All joints and seams in the air supply system must be made air tight and a bird screen used at the inlet.

For full details refer to section 2.13

Figure 5.a. Header Duct Connection

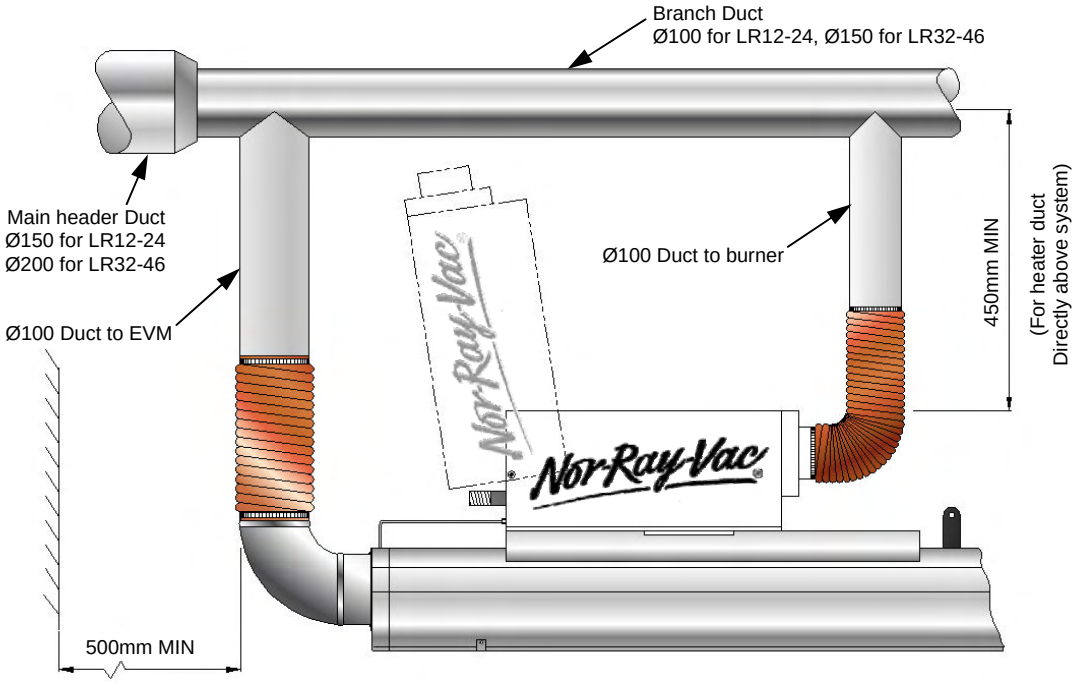


Figure 5.b.
End Vent Ducted
Air Inlet Connection

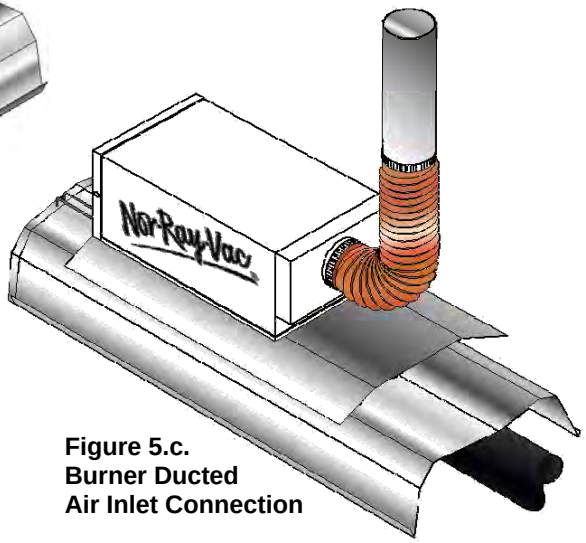
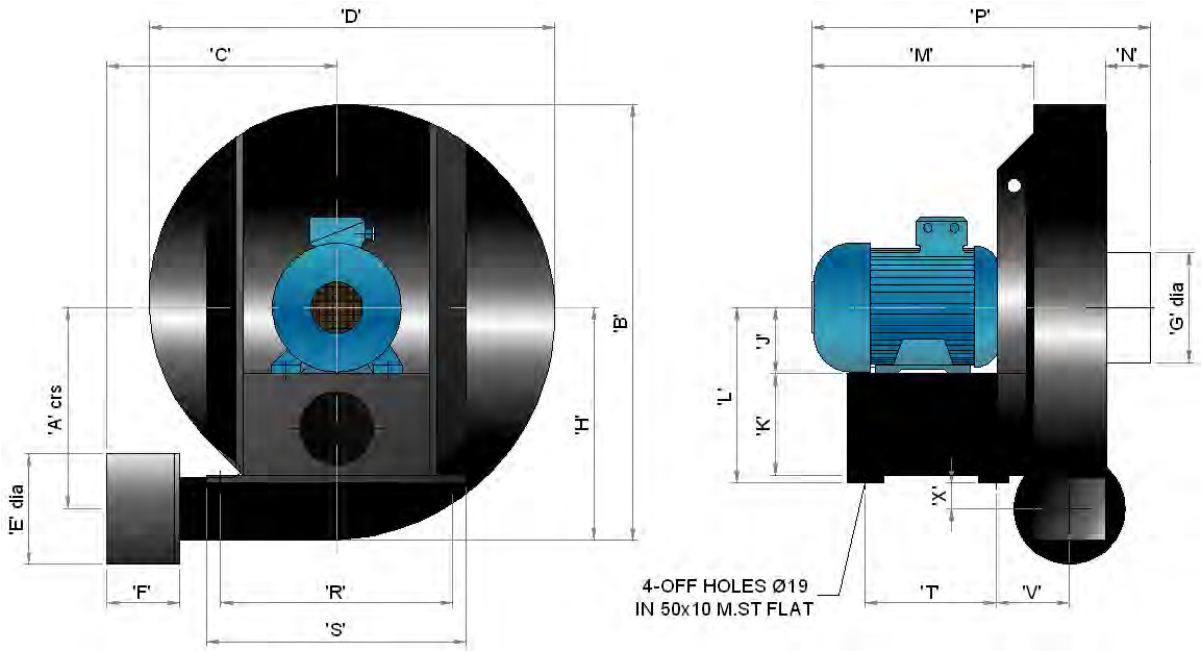


Figure 5.c.
Burner Ducted
Air Inlet Connection

1.9 Vacuum fan mounting details (Type ‘B160’ fan illustrated)



Fan Size	B80	B160	B300	BH300
A (crs)	216	276	286	324
B	595	595	625	704
C	305	308	330	352
D	580	555	575	650
E (Ø)	150	152	152	152
F	50	97	50	50
G (Ø)	150	150	150	148
H	295	318	340	380
J	80	90	90	110
K	150	140	140	120
L	240	240	240	240
M	309	303	341	404
N	50	62	157	157
P	421	463	616	680
R (crs)	318	318	318	318
S (crs)	356	356	356	356
T	204	204	204	204
V	115	115	115	115
X	21	36	46	84

1.10 Technical Details.

Tables 4a & b Burner Details

No of Injectors	1
Gas Connection	½ in BSP Internal thread
Burner current	0.05 (per burner)
Electrical Voltage/Ph/Hz	230 volt 1 phase 50Hz

			Burner Type	**12LR**	**18LR**	**24LR**	**32LR**	**38LR**	**46LR**
Burner Details									
G20 Natural Gas		Gas Category							II
		Heat input (Gross)	kW	12	18	24	32	38	46
		Gas consum rate Nat Gas G20	m³/h	1.14	1.72	2.29	3.05	3.62	4.38
		Max Inlet pressure Nat Gas G20	mbar						50
		Min Inlet Pressure Nat Gas G20	mbar						17.5
		Hs Nat Gas G20	MJ/m³						37.78
		Hi Nat Gas G20	MJ/m³						34.02
		d Nat Gas G20							0.555
		Ws Nat Gas G20	MJ/m³						50.72
		Wi Nat Gas G20	MJ/m³						45.67
		Injector size Nat Gas G20	mm	3.6	4.4	4.9	5.4	5.8	6.3
		Injector Part No.		L100336	L100544	L100549	L100554	L100558	L100563
		Air shutter size Nat Gas G20	mm	13	17	19.5	22.0	24.0	26.5
		Air shutter Part No.		L100322	L100321	L100320	L100314	L100316	L100318
G25 Natural Gas		Gas Category							II
		Heat input (Gross)	kW	12	18	24	32	38	46
		Gas consum rate Nat Gas G25	m³/h	1.33	1.99	2.66	3.55	4.21	5.10
		Max Inlet pressure Nat Gas G25	mbar						50
		Min Inlet Pressure Nat Gas G25	mbar						20
		Hs Nat Gas G25	MJ/m³						32.49
		Hi Nat Gas G25	MJ/m³						29.25
		d Nat Gas G25							0.612
		Ws Nat Gas G25	MJ/m³						41.52
		Wi Nat Gas G25	MJ/m³						37.38
		Injector size Nat Gas G25	mm	3.7	4.6	5.2	5.8	6.3	6.9
		Injector Part No.		L100537	L100546	L100552	L100558	L100563	L100569
		Air shutter size Nat Gas G25	mm	13	17	19.5	22.0	24.0	26.5
		Air shutter Part No.		L100322	L100321	L100320	L100314	L100316	L100318

Tables 4c & d Burner Details

	Burner Type		12LR	18LR	24LR	32LR	38LR	46LR
Burner Details								
G30 Butane Gas	Gas Category							III
	Heat input (Gross)	kW	12	18	24	32	38	46
	Gas consum rate Butane G30	m³/h	0.34	0.52	0.69	0.92	1.09	1.32
	Max Inlet pressure Butane G30	mbar						35
	Min Inlet Pressure Butane G30	mbar						20
	Hs Butane G30	MJ/m³						125.81
	Hi Butane G30	MJ/m³						116.09
	d Butane G30							2.075
	Ws Butane G30	MJ/m³						87.33
	Wi Butane G30	MJ/m³						80.58
	Injector size Butane G30	mm	2.6	3.2	3.7	4.2	4.6	5.1
	Injector Part No.		L100526	L100532	L100537	L100542	L100546	L100551
	Air shutter size Butane G30	mm	13	17	19.5	22.0	24.0	26.5
	Air shutter Part No.		L100322	L100321	L100320	L100314	L100316	L100318
G31 Propane Gas	Gas Category							III
	Heat input (Gross)	kW	12	18	24	32	38	46
	Gas consum rate Propane G31	m³/h	0.45	0.68	0.90	1.21	1.43	1.73
	Max Inlet pressure Propane G31	mbar						57.5
	Min Inlet Pressure Propane G31	mbar						25
	Hs Propane G31	MJ/m³						95.65
	Hi Propane G31	MJ/m³						88.00
	d Propane G31							1.55
	Ws Propane G31	MJ/m³						76.84
	Wi Propane G31	MJ/m³						70.69
	Injector size Propane G31	mm	2.9	3.5	4.0	4.4	4.8	5.2
	Injector Part No.		L100529	L100535	L100540	L100544	L100548	L100552
	Air shutter size Propane G31	mm	13	17	19.5	22.0	24.0	26.5
	Air shutter Part No.		L100322	L100321	L100320	L100314	L100316	L100318

Hs = Gross CV
Hi = Net CV
Ws = Wobbe number on gross CV
Wi = Wobbe number on net CV
d = specific density
Reference gas conditions = dry, 15ºC 1013 mbar

Table 5. Heater Details

Burner Type		12LR	18LR	24LR	32LR	38LR	46LR
Min distance between burners	m	5.2	7.4	9.4	14	18	23
Max distance between burners	m	7.2	10.2	13.1	18	23	27
Min distance between burner and fitting	m	3.6	3.6	5.0	6.0	7.0	8.0
Max tube temp	°C			450			480
Min mounting height	m	3.0	3.6	4.0	4.7	5.3	6.0
Max burners per branch		5	4	3	3	3	3

Table 6. Heater Noise Data

Burner Type		12LR	18LR	24LR	32LR	38LR	46LR
Noise level @ 3m below **In-Line BURNER**	db(A)	tba	tba	37	tba	tba	tba
	NR±2	tba	tba	33	tba	tba	tba
Noise level @ 3m below **EVM Burner**	db(A)	tba	tba	tba	tba	tba	tba
	NR±2	tba	tba	tba	tba	tba	tba
Noise level @ 3m below **EVM with silencer**	db(A)	tba	tba	tba	36	tba	tba
	NR±2	tba	tba	tba	33	tba	tba
Noise level @ 3m below **EVM Burner with Ducted Air**	db(A)	tba	tba	tba	37	tba	tba
	NR±2	tba	tba	tba	34	tba	tba

Table 7. End Vent Module (EVM)

Burner Type		12LR	18LR	24LR	32LR	38LR	46LR
End vent setting (hot) - Multi burner systems	mbar	6.25	6.25	6.25	6.25	6.25	6.25
End vent setting (hot) - SINGLE End Vent burners only	mbar	n/a	n/a	n/a	7.5	8.25	9.25
End vent setting (hot) - THREE burners in a branch	mbar	n/a	n/a	n/a	n/a	n/a	5.6
End Vent orifice diameter	mm	14.5	16	24	27	32	n/a
End Vent orifice Part No.		L104102	L104101	L104100	L104093	L104092	n/a

Table 8. System Weights

Burner Type		12LR	18LR	24LR	32LR	38LR	46LR
LR Burner	kg						8.3
Radiant branch*	kg/m						8.3
Radiant branch + Slimline grille*	kg/m						10.9
Radiant branch + Protective guard*	kg/m						10.0
4” Mild steel tail pipe	kg/m						5.5
4” Aluminum tail pipe	kg/m						0.9
6” Mild steel tail pipe	kg/m						10.6
6” Aluminium tail pipe	kg/m						1.3
Max / susp point @ EV position	kg						24.2

** without burners or ducted air systems*

Table 9. Fan Details

Fan Size		B80	B160	B300	BH300
Fan part number		201760	201761	201762	201763
Motor (TEE)		QS 80M2B H	QS 90S2A-40H	QS 90L2A H	QS 112M2A H
Power	kW	1.1	1.5	2.2	4.0
Supply to Fan	V/Hz/P	230~50/3	230~50/3	230~50/3	400~50/3
Run Current	A	4.38	5.6	8.48	7.2
Start Current	A	n/a	n/a	n/a	54.0
Speed	RPM	2850	2860	2840	2880
Wired	Inverter	Δ	Δ	Δ	Δ
	D.O.L.	人	人	人	
Flow rate @ 20°C	m³/h	368	736	1380	1380
Flow rate @ 150°C	m³/h	259	519	972	972
Pressure	mbar	29	29	29	42
Max Operating Temp.	°C	200	200	200	200
Weight	kg	45	52	58	75

Table 10. Local Relay Unit

Fan Size		B80	B160	B300	BH300
LRU part number		900274	900088	900089	900282
Inverter type	kW	1.5	1.5	2.2	n/a
Supply to LRU	V/Hz/P	230~50/1	230~50/1	230~50/1	400~50/3
Line Current	A	14.8	14.8	20.8	n/a
Motor Current	A	4.2	5.6	7.8	7.2
Fuse Rating	A	22	22	30	n/a
Acceleration Time	s	25	25	25	n/a
Deceleration Time	s	25	25	25	n/a

Table 11. Fan Noise Data

Fan Size		B80	B160	B300	BH300
Noise level @ 3m below fan	db(A)	63	64	65	68
	NR±2	57	58	59	62
Noise level @ 3m below fan **with motor muff**	db(A)	62	63	64	66
	NR±2	56	57	58	60
Noise level @ 3m below **in acoustic enclosure**	db(A)	51	53	55	58
	NR±2	45	47	49	52
Flue horizontal/vertical @ 3m	db(A)	69	72	75	77
	NR±2	63	66	69	71
Flue horizontal/vertical @ 3m **With exhaust silencer**	db(A)	56	57	58	58
	NR±2	50	51	52	52

Notes.

Notes.

2. User & Operating Instructions.

2.1 To Start the Heater

1. Ensure that gas supply is turned on at each burner.

2. Switch on electrical supply to heaters.

3. Ensure that the controls are correctly set i.e.;

   - Clock is correctly set.
   - Heater program is correctly set.
   - Required room temp is correctly set

4. The vacuum fan will operate and at the same time the **red** neon lights will illuminate at all burners. After 10 seconds the burners closest to the exhaust fan in each radiant branch will light, with both **red** and **amber** neons illuminated. After a further 25 seconds the next burner in line within each radiant branch will light and after a further 25 seconds the end vent burner will light.

5 If the lighting up sequence fails and lockout occurs press the lockout reset button (if available), or switch off the electrical supply and restart after 40 seconds. If lockout occurs three times consecutively switch off and isolate the gas and electricity supplies.

Contact the AmbiRad Service department.

2.2. To Switch Off Heater

1. Switch off electrical supply to the heater. The burner will stop and the fan will shut off.

2. If the heater is to be switched off for periods in excess of one week it is highly recommended that both the gas and the electrical supplies are turned off.

2.3 Routine Maintenance between Service Intervals

After ensuring that the heater is cold and mains electric isolated, cleaning of the reflectors with a soft cloth and a mild detergent (non solvent based cleaners only) in water can be undertaken.

Additional removal of dust from the radiant tubes, burner and heat exchanger can be undertaken.

2.4 Frequency of Servicing

The manufacturer recommends that to ensure continued efficient and safe operation of the appliance, the heater is serviced annually by a competent person e.g. every year in normal working conditions but in exceptional dusty or polluted conditions more frequent servicing may be required.

The manufacturer offers a maintenance service.

Details are available on request.

For Service requirements, please contact AmbiRad.

For further technical and service support visit our Support Information Database at www.s-i-d.co.uk

Note This notice must be fixed alongside the electrical service switch. On some systems only the end vent burner contains a delay timer. In this instance the inline burners will light simultaneously and the end vent burners will light after an 80 seconds delay.

Document reference number **GB/NRV/193I/0314**

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