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POWRMATIC®

LNVx

User, Installation & Servicing Manual

Issue 1.8 Apr 2020

ErP COMPLIANT
SEPTEMBER 2018

POWRMATIC®

Certificate of Guarantee

This is to certify that this heater is guaranteed for two years parts and one year labour from the date of original commissioning. The heater must be commissioned within 4 weeks of installation.

To make a claim

In the first instance you must contact your appliance supplier, or installer and provide:-

1. The appliance type and serial number.
2. The original commissioning documentation. As much detail as possible on the fault.
3. Your supplier, or installer, will then contact Powrmatic to make a guarantee claim on your behalf.

Conditions of Guarantee

1. The heater must have been installed by a competent qualified installer, and in accordance with the manufacturer's instructions, building regulations and local regulations.
2. The heater has been professionally commissioned, within 4 weeks of installation, and a copy of the commissioning sheet returned to Powrmatic.
3. The heater has been maintained on a yearly basis by a competent and qualified servicing company.
4. The heater has been used in accordance with the manufacturer's instructions.
5. The correct specification fuel has been used.
6. No unauthorised repairs of modifications have been made. Powrmatic 'General Conditions of Sales' have been observed.
7. Except for the obligation of Powrmatic Ltd to perform warranty repairs during the guarantee period, Powrmatic will not be liable in respect of any claim for direct or indirect consequential losses, including loss of profits or increased cost arising from loss of use of the heater, or any event arising there from.

Exclusions

Consumables such as gaskets, ignition electrodes, flame rectification electrodes, drive belts, fusible links, control batteries are all excluded from guarantee.

Powrmatic Ltd, Hort Bridge, Ilminster, Somerset, TA19 9PS
Tel: 01460 53535 **Fax: 01460 52341**
Web: www.powrmatic.co.uk **e-mail: warranty@powrmatic.co.uk**

Important: This certificate must be kept with the appliance

Failure to provide a copy of the commissioning sheet invalidates the heater warranty

Users, Installation and Servicing Instructions

CONTENTS

Warnings

When working on this appliance the following warnings must be observed:

Danger: Electricity

Warning: Flammable Materials

Warning: Hot Surfaces

Warning: Contains Moving Parts

Read and understand this Service Manual Instructions before operating or servicing this appliance

User Instructions

If the heater has not been left operational proceed as follows.

A) Checks before operating the Air Heater

The following preliminary checks should be made before lighting the heater(s)

a) Ensure that the ELECTRICAL supply to the heater is switched OFF.
b) Check that any warm air delivery outlets are open.
c) Check that the thermostat is set.
d) Check that the clock control is set to an ON period.
e) Check that any other controls are calling for heat.

B) Operating the Air Heater

1. Switch on the electrical supply at the isolator

2. If the Red Limit indicator lamp is illuminated, identify the limit stat, remove the black cap and press the reset button.

3. The startup sequence will commence. After a short delay the burners will light and the green 'ON' indicator on the front of the heater will be illuminated.

4. If the burners fail to light the control box will automatically restart the ignition sequence. If after 5 attempts at ignition the burners have still failed to light the control box will go to lockout and the Amber lockout lamp on the front of the heater (or on the low level remote reset, or MC200/MC300 if fitted) will be illuminated. To restart the ignition sequence depress the reset button on the low level reset for about 1-2 seconds.

WARNING: If it is not possible to light the heater after several attempts, contact the installer or local service company.

C) To Shut Down the Air Heater

1) For Short Periods:

Turn the room thermostat to the OFF, or set to 'Summer Mode'.

2) For Long Periods:

Complete step 1 above. Wait for 5 minutes and then turn OFF the electrical supply at the isolator.

D) Description of Operation

Important: The heater must NOT be controlled by switching ON and OFF the main electrical supply to it.

1) Standard Units

The ignition sequence commences each time the external controls e.g. time clock, room thermostat, controller etc. call for heat. The internal exhaust fan will run and, when sufficient combustion airflow is proved by the air pressure switch, the ignition spark will be generated, the main gas valve opens and the burners will light on HIGH FIRE for the first 30 seconds irrespective of the requirements of the external control. The green 'ON' indicator will be illuminated. The heater fan will automatically start 30 seconds after the burners light. After the first 30 seconds, the heat output will then be controlled either to high fire or low fire depending on the requirements of the space being heated and the external controls fitted. When the external controls are satisfied the burners will be turned off and 2½ minutes later the heater fan will automatically stop. If the burners fail to light the control box will make another four attempts at ignition before going into burner lockout. The amber 'Lockout' indicator/reset switch will be illuminated.

2) Modulating Units

When the burners are alight, the heat output will be controlled to any point between high and low fire; depending on the requirements of the space being heated and the external controls fitted.

3) Summer / Winter Modes

Certain types of external controls will provide for two modes of operation i.e:
Summer: The heater fan alone will run at the dictate of the external controls to provide air movement.
Winter: The heater will operate normally.

4) Overheat Thermostat

This operates if high temperatures within the heater are detected, the burners are turned off and a Red indicator lamp on the front panel is illuminated. LNVx15 - 70 units have a single thermostat located inside the heater. LNVx35 & 90 - 140 units have an additional thermostat on the side of the unit at the opposite end to the controls (either thermostat can go to limit and shut off the burners). The fault condition must be identified and rectified and the thermostat manually reset via the red high limit reset switch. When the unit has cooled, identify the limit stat, remove the black cap and press the reset button. The red indicator lamp will go out and the unit is operational again.

Note: The limit thermostat(s) can only be reset once the unit has cooled down. Unless the cause of the fault condition is readily obvious, for example a power cut whilst the heater was operating, a service engineer should be contacted.

E) Maintenance

To maintain efficient, reliable and safe operation of the heater it must serviced annually by a qualified person.

F) IMPORTANT

Free access must be maintained to and around the heater for servicing purposes and the air supply to the heater must not be restricted in any way. Combustible materials must not be stored adjacent to the heater.

If at any time a gas leak is suspected, turn OFF the gas supply at the meter and contact the local gas undertaking immediately.

All Powrmatic heaters use gas and electricity to power them, they may also contain moving parts such as pulleys and belts. It would be hazardous to tamper with or attempt to service unless you are a competent person in the field of Gas and Electrical work.

If you have any safety questions reference the servicing and installation of any of our heaters please do not hesitate to contact our head office for expert advice. Your safety is paramount to us.

Gas Safety (Installation & Use) (Amendment) Regulations 2018

It is law that all gas appliances are installed, adjusted and, if necessary, converted by qualified persons* in accordance with the current issue of the above regulations. Failure to install appliances correctly can lead to prosecution. It is in your own interests and that of safety to ensure that the law is complied with.

* Gas Safe Registered Engineer

1.1 Introduction

The LNVx range are highly efficient, gas fired, fanned circulation air heaters that cover heat outputs of 15kW to 140kW, have a closed combustion circuit and are supplied complete with a flue system.

LNVx heaters are certified for use on Natural Gas, Group H - G20*. Appliance Categories are Cat II2H (GB, IE). All LNVx heaters are CE certified and conform to all the European directives stated in section 1.3.1

LNVx heaters are designed to be suspended from suitable roof points or alternatively to be mounted on purpose designed brackets and are intended primarily for heating commercial or industrial premises. All variants are for internal use only.

LNVx heaters feature a closed combustion circuit and have an internal exhaust fan, mounted downstream of the heat exchanger, to evacuate the products of combustion and draw in air for combustion. The air heater must be connected to a flue system that is approved by Powrmatic Ltd.

LNVx heaters may be used where the atmosphere inside the premises could be contaminated e.g. Dust, oil mist etc. but the heaters are not airtight and therefore may not be used in areas classified as hazardous as defined in BS 5345: Part 2 or areas subjected to significant negative pressures due to extract systems.

LNVx F, LNVx Duo and LNVx V heaters have an axial fan assembly fitted to circulate the air being heated through the formed tube heat exchanger. LNVx CCF units are supplied with a centrifugal fan and LNVx D units for use with ducted systems where the air moving fan is by others or a centrifugal fan section is used adjacent to or remote from the heater. LNVx DH units are for use in air handling units.

Heaters are fitted as standard with inshot burners, a fully automatic control for ignition, flame sensing, gas supply control and safety functions, an internal exhaust fan, main air fan (F and CCF models), limit thermostat and fan command module.

Options include High/Low or Modulating burner controls, inlet duct connection, outlet duct connection, 30°, 45° head, 90° outlet bend, vertical/horizontal outlet louvre assembly and a full range of modular duct components.

IMPORTANT

Service and Maintenance Engineers shall ensure that replacement items are fitted, adjusted and set in accordance with the data and detail set out in these instructions. If in doubt consult Powrmatic Technical Department.

** LPG conversion kits available.*

Technical Specification

LNVx

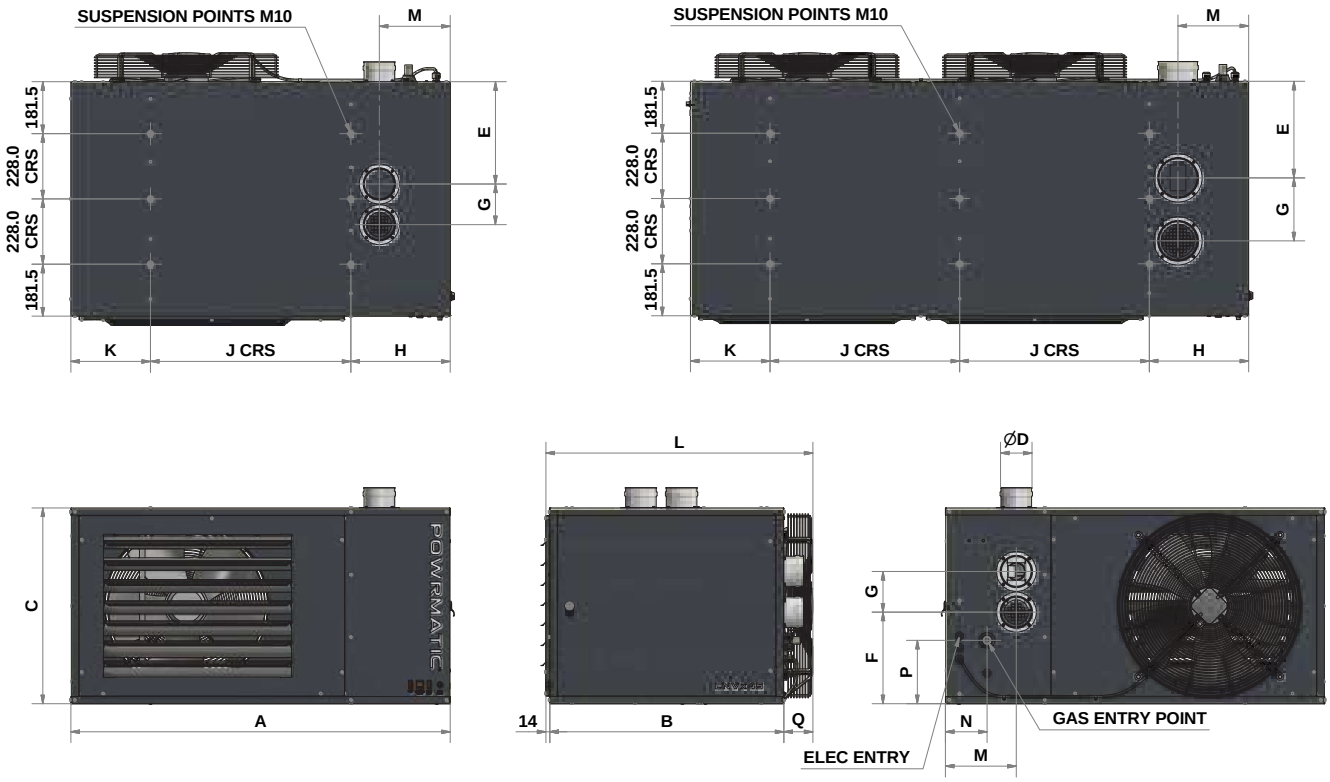
Model					15	20	25	30	35	40	45	50	60	70	90	120	140
Output (nominal)		High Fire (max)		kW	14.5	19.0	24.0	30.0	34.0	37.5	44.0	50.5	60.0	70.5	90.0	118.5	137.0
		Low Fire (min)		kW	8.6	12.7	16.3	19.8	23.8	25.5	29.8	33.9	40.8	47.8	65.3	83.5	93.3
Input (nett CV)		High Fire (max)		kW	15.5	20.5	26.0	32.5	36.5	40.5	47.0	54.5	66.0	76.5	97.5	127.0	146.0
		Low Fire (min)		kW	9.53	14.07	18.16	22.4	26.08	28.17	32.46	37.41	45.07	52.91	71.65	90.83	101.16
Airflow Volume		LNVx F/CCF/V		m^3/s	0.42	0.56	0.78	0.97	1.11	1.18	1.51	1.51	1.83	1.94	2.81	3.56	3.75
		LNVx D	Min	m^3/s	0.42	0.56	0.78	0.97	1.11	1.18	1.51	1.51	1.83	1.94	2.81	3.56	3.75
			Max	m^3/s	0.46	0.62	0.86	1.20	1.22	1.30	1.67	1.67	2.02	2.14	3.09	3.91	4.13
Airflow	Throw	LNVx F		m	10.0	14.0	20.0	23.0	28.0	30.0	35.0	35.0	38.0	42.0	44.0	45.0	45.0
	Fan Static	LNVx CCF		Pa	220	320	220	220	200	150	250	250	250	250	180	290	250
Electrics	Supply	Standard		V/ph/Hz	230/1/50												
		Optional*		V/ph/Hz	400/3/50 *on Centrifugal Units Only. 3Ph units shown in brackets ()												
	LNVx F	Run		amp	0.40	0.45	0.52	0.65	1.14	0.85	1.53	1.57	2.30	2.20	3.06	4.35	4.45
	LNVx CCF	Start		amp	5.0	8.5	13.3	13.3	15.6	18.0	26.3	26.3	29(16.5)	38(18)	31.0	40(14.9)	44(16.8)
		Run		amp	2.0	3.1	4.2	4.3	4.7	5.8	7.6	7.6	10(4.8)	11(5.3)	12.8	17(4.6)	20(4.9)
Fuel	Connection			BSP/Rc	¾"											1"	
	Nominal Inlet Pressure		Nat Gas	mbar	20.0												
			LPG	mbar	37.0												
	Consumption		Nat Gas	m^3/h	1.64	2.17	2.75	3.44	3.86	4.29	4.97	5.77	6.98	8.10	10.32	13.44	15.45
			LPG	m^3/h	0.63	0.83	1.06	1.06	1.52	1.66	1.90	2.20	2.65	3.16	4.01	5.10	5.90
Mounting Height	LNVx F/Duo Crossflow		Min	m	2.5						3.0						
			Max	m	3.0				3.5		5.0						
	LNVx V Downflow		Min	m	2.5	4.0					5.0				6.0		
			Max	m	3.0	6.0			7.0		8.0				10.0	12.0	
Overall Dims	LNVx F	Height		mm	430	500	570	670	532	720	684	684	760	912	810	975	1140
		Width		mm	997	997	997	997	1325	997	1325	1325	1325	1325	1950	1950	1950
		Depth		mm	800	869	819	834	918	839	938	938	915	915	938	915	915
Install Clearance	LNVx F	Top		mm	200												
		LH Side		mm	200												
		RH Side		mm	1000												
		Rear		mm	400												
Flue	Diameter			mm Ø	80	80	80	100	100	100	100	100	130	130	130	130	130
	Max Length	Flue Only		m	12												
		Room Sealed		m	6												
Combustion Air Spigot				mm Ø	80	80	80	100	100	100	100	100	130	130	130	130	130
Noise Levels	LNVx F			dB(A)	48	47	47	50	50	58	59	59	60	60	63	64	64
	LNVx CCF			dB(A)	55	55	54	54	N/A	60	60	61	62	62	66	67	67
Nett Weight	LNVx F			kg	59.5	73.0	76.5	81	84.0	103	122	122	135	149	202	238	286
	LNVx CCF			kg	71.0	83.6	86.4	94	N/A	122	143	143	170	213	329	364	430
Model					15	20	25	30	35	40	45	50	60	70	90	120	140

Notes:

Fuel Consumption and input figures based upon nett calorific values as follows: -

Natural Gas (G20) nett CV 34.02 MJ/m^3 - Propane (G31) nett CV 88.00 MJ/m^3

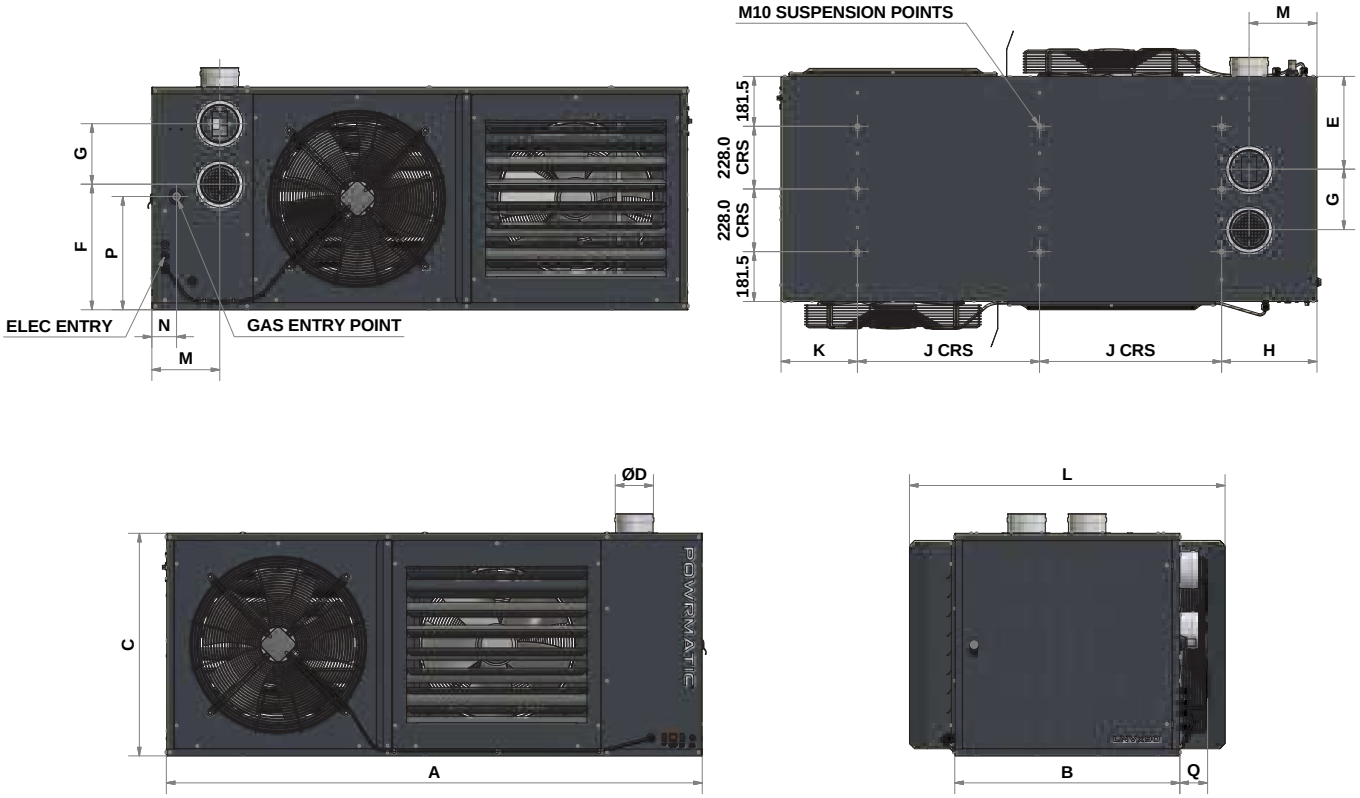
- Heaters have efficiency levels which meet with the minimum heater efficiency requirements of UK Part L Building Regulations.
- LNVx heaters comply with the seasonal efficiency and NOx limits requirements of the Ecodesign regulation (EU) 2015/1188, Directive 2009/125/EC – Lot 21 Tier 1
- Standard heaters configured as High/Low. Optional modulation available.
- Air handling data is assessed at room ambient conditions
- Throw figures provide the distance to the point where the terminal velocity degrades to 0.25m/s
- Dimensions, weights and clearance data in the table above refer to LNVx F units only - for data on all other models refer to the dimensions page and/or the installation instructions.
- Noise levels are applicable to standard LNVx F and LNVx V models and are measured 5m from appliance in a free field.
- Motor kW, run and start amps apply to standard electrical supply as stated. For optional data contact sales office.
- Optional 3 phase direct drive centrifugal blowers shown in italics within brackets().
- Connection of combustion air duct is not required for 'flue only' applications.
- It is the responsibility of the installing contractor to ensure that ductwork is correctly sized and balanced when installing LNVx Centrifugal units.



Model		15	20	25	30	35	40	45	50	60	70	90	120	140
A	mm	997	997	997	997	1325	997	1325	1325	1325	1325	1950	1950	1950
B	mm	700	730	730	730	819	730	819	819	819	819	819	819	819
C	mm	430	500	570	670	532	720	684	684	760	912	810	975	1140
DØ	mm	80	80	80	100	100	100	100	100	130	130	130	130	130
E	mm	248	268	268	268	357	268	357	357	357	357	337.5	337.5	337.5
F	mm	198.5	248	318	396	225	446	320	325	325	476	457	622	787
G	mm	120	120	120	120	142	142	142	142	220	220	220	220	220
H	mm	317	317	317	317	347	317	347	347	347	347	347	347	347
J	mm	450	450	450	450	700	450	700	700	700	700	662.5	662.5	662.5
K	mm	230	230	230	230	278	230	278	278	278	278	278	278	278
L	mm	800	869	819	834	918	839	938	938	915	915	938	915	915
M	mm	217.5	217.5	217.5	217.5	247.5	217.5	247.5	251	237	237	247	247	247
N	mm	117	117	117	117	145.5	117	145.5	145.5	145.5	145.5	90	90	90
P	mm	175	172	245	219	220	285	221.5	221.5	298	373.5	412	413	481
Q	mm	86	125	75	90	85	95	105	105	82	82	105	82	82

Dimensions

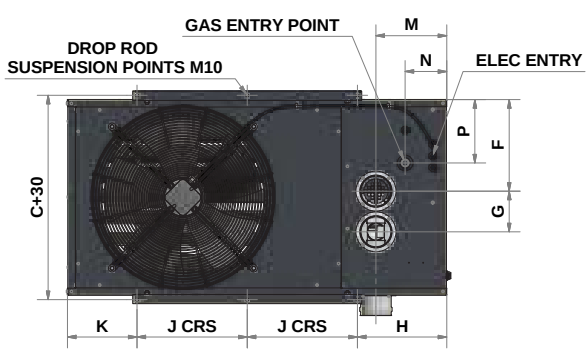
LNVx Duo- Axial Fan Bi-directional Units

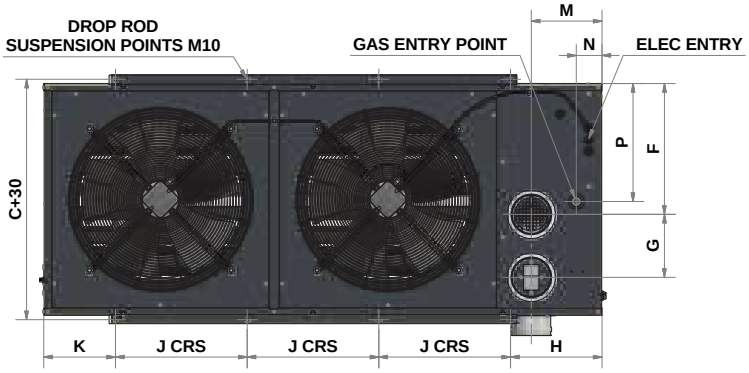


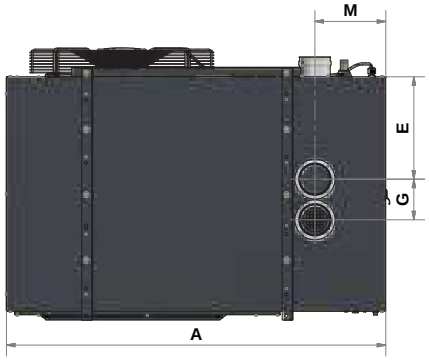
Model		90	120	140
A	mm	1950	1950	1950
B	mm	819	819	819
C	mm	810	975	1140
DØ	mm	130	130	130
E	mm	337.5	337.5	337.5
F	mm	457	622	787
G	mm	220	220	220
H	mm	347	347	347
J	mm	662.5	662.5	662.5
K	mm	278	278	278
L	mm	1150	1150	1150
M	mm	247	247	247
N	mm	90	90	90
P	mm	412	413	481
Q	mm	105	82	82

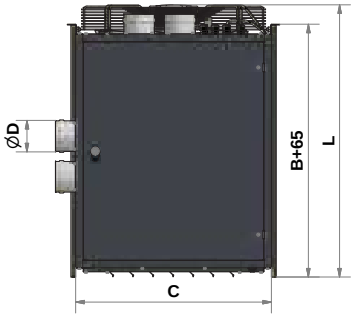
Dimensions

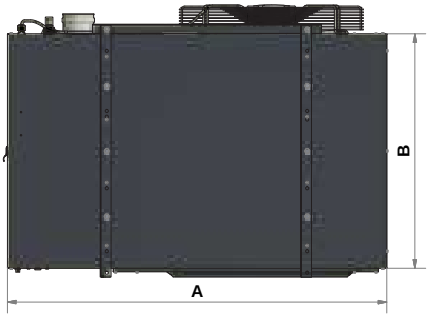
LNVx V - Axial Fan Downflow







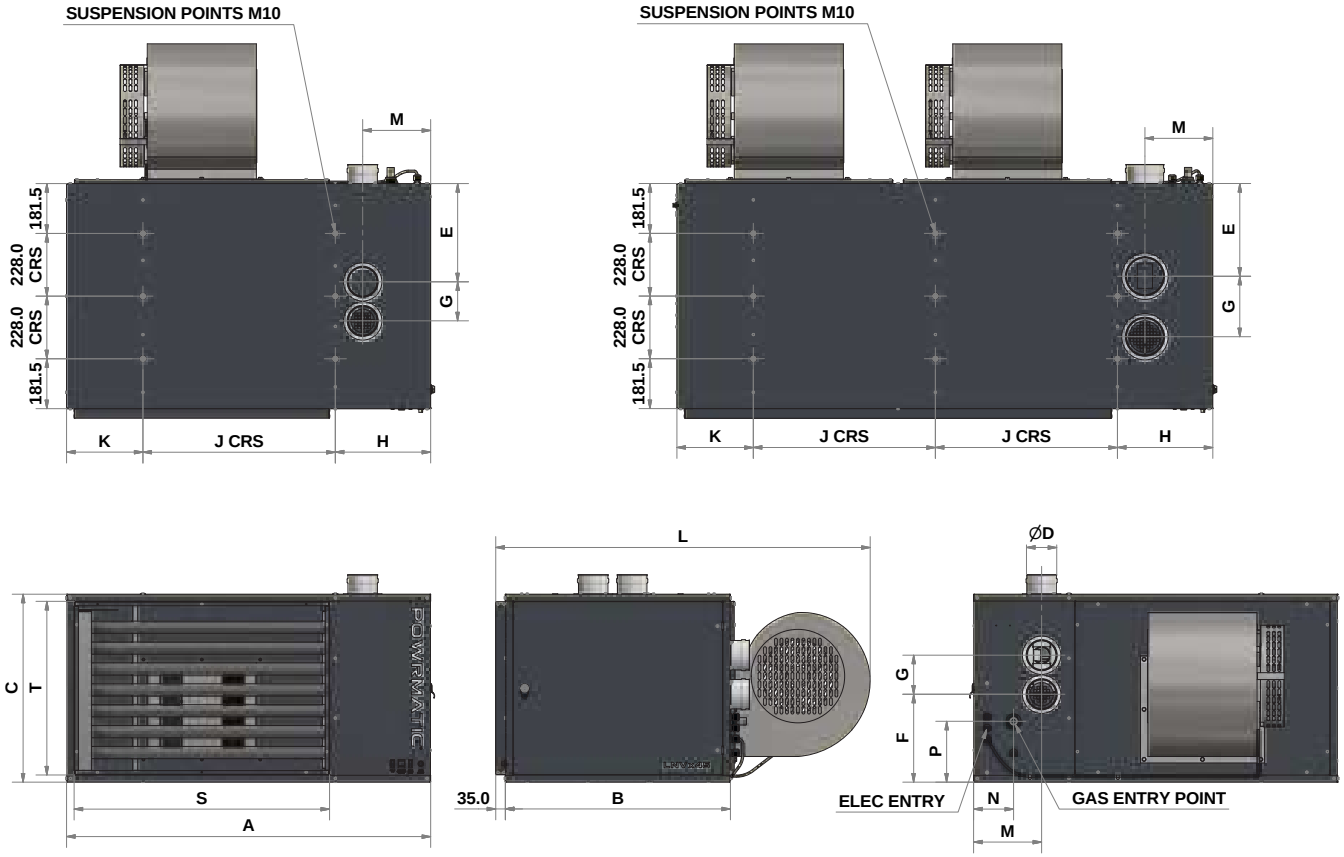




Model		15	20	25	30	35	40	45	50	60	70	90	120	140
A	mm	997	997	997	997	1325	997	1325	1325	1325	1325	1950	1950	1950
B	mm	700	730	730	730	819	730	819	819	819	819	819	819	819
C	mm	430	500	570	670	532	720	684	684	760	912	810	975	1140
DØ	mm	80	80	80	100	100	100	100	100	130	130	130	130	130
E	mm	248	268	268	268	357	268	357	357	357	357	337.5	337.5	337.5
F	mm	198.5	248	318	396	225	446	320	325	325	476	457	622	787
G	mm	120	120	120	120	142	142	142	142	220	220	220	220	220
H	mm	289.5	289.5	289.5	289.5	319.5	289.5	319.5	319.5	319.5	319.5	319.5	319.5	319.5
J	mm	260	260	260	260	385	260	385	385	385	385	460	460	460
K	mm	202.5	202.5	202.5	202.5	250.5	202.5	250.5	250.5	250.5	250.5	250.5	250.5	250.5
L	mm	820	885	835	850	934	855	954	954	929	929	954	929	929
M	mm	217.5	217.5	217.5	217.5	247.5	217.5	247.5	251	237	237	247	247	247
N	mm	117	117	117	117	145.5	117	145.5	145.5	145.5	145.5	90	90	90
P	mm	175	172	245	219	220	285	221.5	221.5	298	373.5	412	413	481

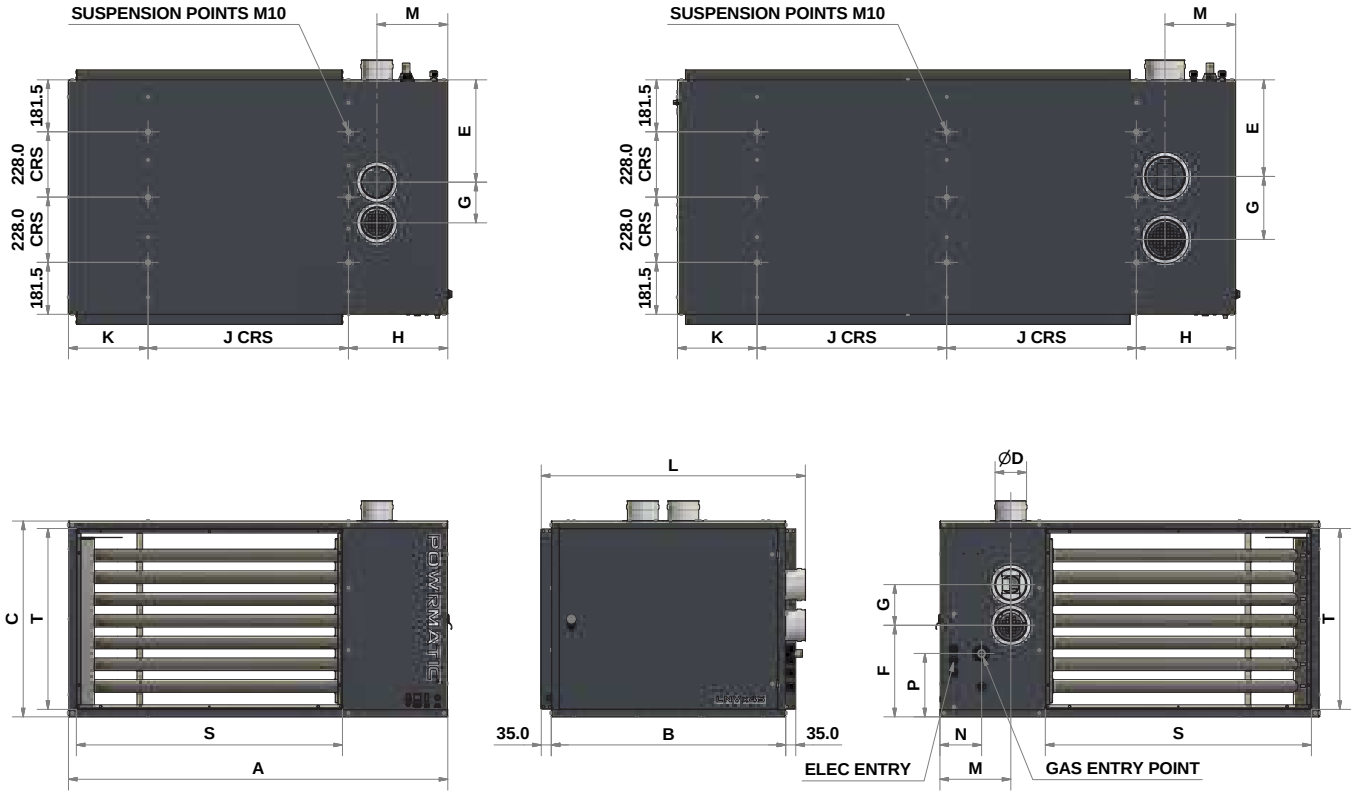
Dimensions

LNVx CCF- Centrifugal Close Coupled Fan Units



Important: Please refer to section 1.3.7.1 for ducting requirements

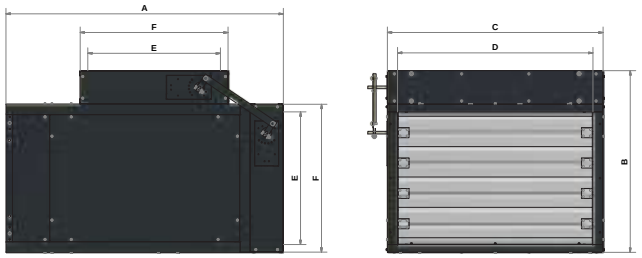
Model		15	20	25	30	35	40	45	50	60	70	90	120	140
A	mm	997	997	997	997	1325	997	1325	1325	1325	1325	1950	1950	1950
B	mm	700	730	730	730	819	730	819	819	819	819	819	819	819
C	mm	430	500	570	670	532	720	684	684	760	912	810	975	1140
DØ	mm	80	80	80	100	100	100	100	100	130	130	130	130	130
E	mm	248	268	268	268	357	268	357	357	357	357	337.5	337.5	337.5
F	mm	198.5	248	318	396	174	446	320	325	325	476	457	622	787
G	mm	120	120	120	142	142	142	142	142	220	220	220	220	220
H	mm	317	317	317	317	347	317	347	347	347	347	347	347	347
J	mm	450	450	450	450	700	450	700	700	700	700	662.5	662.5	662.5
K	mm	230	230	230	230	278	230	278	278	278	278	278	278	278
L	mm	1130	1205	1205	1275	1365	1275	1450	1450	1450	1450	1365	1450	1450
M	mm	217.5	217.5	217.5	217.5	261	217.5	247.5	251	237	237	247	247	247
N	mm	117	117	117	117	147	117	145.5	145.5	145.5	145.5	90	90	90
P	mm	175	172	245	219.5	144	285	221.5	221.5	298	373.5	412	413	481
S	mm	630	630	630	630	927	630	927	927	927	927	1552	1552	1552
T	mm	376	446	516	616	478	666	631	631	707	858	757	922	1087



Model		15	20	25	30	40	45	50	60	70	90	120	140
A	mm	997	997	997	997	997	1325	1325	1325	1325	1950	1950	1950
B	mm	700	730	730	730	730	819	819	819	819	819	819	819
C	mm	430	500	570	670	720	684	684	760	912	810	975	1140
DØ	mm	80	80	80	100	100	100	100	130	130	130	130	130
E	mm	248	268	268	268	268	357	357	357	357	337.5	337.5	337.5
F	mm	198.5	248	318	396	446	320	325	325	476	457	622	787
G	mm	120	120	120	142	142	142	142	220	220	220	220	220
H	mm	317	317	317	317	317	347	347	347	347	347	347	347
J	mm	450	450	450	450	450	700	700	700	700	662.5	662.5	662.5
K	mm	230	230	230	230	230	278	278	278	278	278	278	278
L	mm	804	834	834	834	834	924	924	924	924	924	924	924
M	mm	217.5	217.5	217.5	217.5	217.5	247.5	251	237	237	247	247	247
N	mm	117	117	117	117	117	145.5	145.5	145.5	145.5	90	90	90
P	mm	175	172	245	219.5	285	221.5	221.5	298	373.5	412	413	481
S	mm	630	630	630	630	630	927	927	927	927	1552	1552	1552
T	mm	376	446	516	616	666	631	631	707	858	757	922	1087

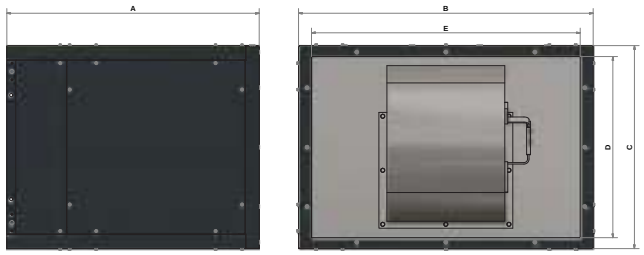
Heater Options

Mixing Box - (LNVx CCF Models Only)



Model	Part Number	Dimensions (mm)					
		A	B	C	D	E	F
LNVx 15/20/25	LNVx15/MB	1160	730	696	600	498	570
LNVx 30	LNVx30/MB	1160	830	696	600	598	670
LNVx 40	LNVx40/MB	1160	880	696	600	648	720
LNVx 45/50	LNVx50/MB	1285	845	994	900	613	685
LNVx 60	LNVx60/MB	1285	920	994	900	688	760
LNVx 70	LNVx70/MB	1285	1070	994	900	838	910
LNVx 90	LNVx90/MB	1285	970	1620	1526	738	810
LNVx 120	LNVx120/MB	1285	1135	1620	1526	903	975
LNVx 140	LNVx140/MB	1455	1300	1620	1526	1068	1140

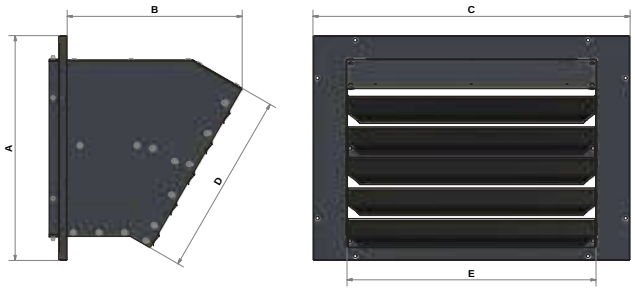
Fan Plenum Box - (LNVx CCF Models Only)



Model	Part Number	Dimensions (mm)				
		A	B	C	D	E
LNVx 15/20/25	LNVx15/FS	750	696	570	480	622
LNVx 30	LNVx30/FS	750	696	670	580	622
LNVx 40	LNVx40/FS	750	696	720	630	622
LNVx 45/50	LNVx50/FS	850	994	685	595	920
LNVx 60	LNVx60/FS	850	994	760	670	920
LNVx 70	LNVx70/FS	850	994	910	820	920
LNVx 90	LNVx90/FS	850	1620	810	720	1546
LNVx 120	LNVx120/FS	850	1620	975	885	1546
LNVx 140	LNVx140/FS	850	1620	1140	1050	1546

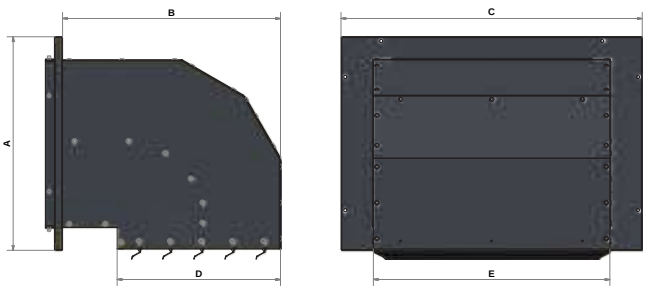
Accessories

30° Downflow Head - (LNVx F Models Only)



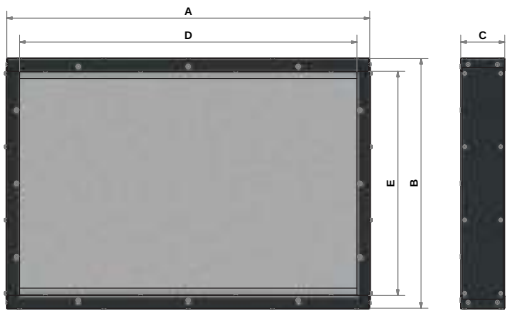
Model	Part Number	Dimensions (mm)				
		A	B	C	D	E
LNVx 15	LNVx15-30DH	376	305	630	280	494
LNVx 20	LNVx20-30DH	446	340	630	350	494
LNVx 25	LNVx25-30DH	516	375	630	420	494
LNVx 30	LNVx30-30DH	616	410	630	500	494
LNVx 35	LNVx35-30DH	478	340	927	350	660
LNVx 40	LNVx40-30DH	666	450	630	570	494
LNVx 45/50	LNVx50-30DH	631	415	927	500	660
LNVx 60	LNVx60-30DH	707	415	927	500	660
LNVx 70	LNVx70-30DH	858	480	927	630	660
LNVx 90	LNVx90-30DH	757	450	757	570	660
LNVx 120	LNVx120-30DH	922	520	757	710	660
LNVx 140	LNVx140-30DH	1087	590	757	850	660

90° Downflow Head - (LNVx CCF Models Only)



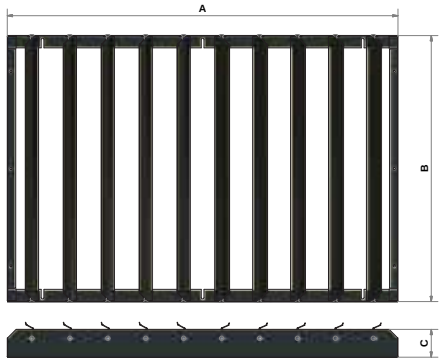
Model	Part Number	Dimensions (mm)				
		A	B	C	D	E
LNVx 15	LNVx15-90DH	376	430	630	280	494
LNVx 20	LNVx20-90DH	446	500	630	350	494
LNVx 25	LNVx25-90DH	516	570	630	420	494
LNVx 30	LNVx30-90DH	616	650	630	500	494
LNVx 40	LNVx40-90DH	666	720	630	570	494
LNVx 45/50	LNVx50-90DH	631	650	927	500	660
LNVx 60	LNVx60-90DH	707	650	927	500	660
LNVx 75	LNVx70-90DH	858	780	927	630	660
LNVx 90	LNVx90-90DH	757	720	757	570	660
LNVx 120	LNVx120-90DH	922	860	757	710	660
LNVx 140	LNVx140-90DH	1087	1000	757	850	660

Filter Box - (LNVx CCF Models Only)



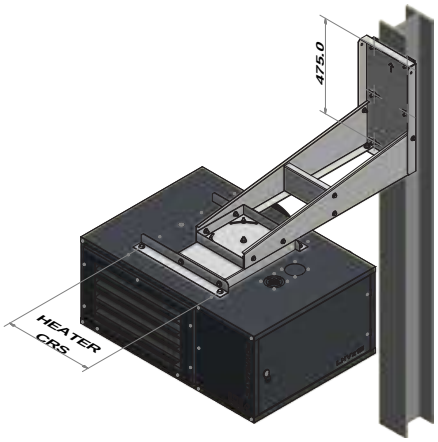
Model	Part Number	Dimensions (mm)				
		A	B	C	D	E
LNVx 15/20/25	LNVx15-FB	696	570	120	626	500
LNVx 30	LNVx30-FB	696	670	120	626	600
LNVx 40	LNVx40-FB	696	720	120	626	650
LNVx 45/50	LNVx45-FB	994	685	120	924	615
LNVx 60	LNVx60-FB	994	760	120	924	690
LNVx 70	LNVx70-FB	994	910	120	924	840
LNVx 90	LNVx90-FB	1620	810	120	1550	740
LNVx 120	LNVx120-FB	1620	975	120	1550	905
LNVx 140	LNVx140-FB	1620	1140	120	1550	1070

Vertical Louvres (For Use On All Models)



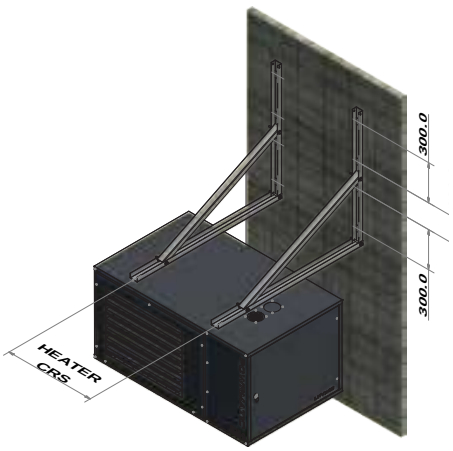
Model	Part Number	Dimensions (mm)		
		A	B	C
LNVx 15	LNVx15-VL	630	376	65
LNVx 20	LNVx20-VL	630	446	65
LNVx 25	LNVx25-VL	630	516	65
LNVx 30	LNVx30-VL	630	616	65
LNVx 35	LNVx35-VL	927	478	65
LNVx 40	LNVx40-VL	630	666	65
LNVx 45/50	LNVx50-VL	927	631	65
LNVx 60	LNVx60-VL	927	707	65
LNVx 70	LNVx70-VL	927	858	65
LNVx 90	LNVx90-VL	757	757	65
LNVx 120	LNVx120-VL	757	922	65
LNVx 140	LNVx140-VL	757	1087	65

Swivel Wall Bracket - (LNVx F Models Only)



Model	Part Number
LNVx 15 - 70	LNVx15-70SWB
LNVx 90 - 140	N/A

Cantilever Wall Bracket - (LNVx F Models Only)



Model	Part Number
LNVx 15 - 70	LNVx15-70WB
LNVx 90 - 140	LNVx90-140WB

Notes:

- Dimensions for the swivel and cantilever brackets remain the same for all LNVx models
- Swivel Brackets can not be used with double units

1.2 Technical Data

Injector Sizes & Burner Pressures - Natural Gas - Group H - G20 Net CV (Hi = 34.02MJ/m³)

(All variants)				High Fire		Low Fire	
	Injectors			Burner Pressure	Gas Rate	Burner Pressure	Gas Rate
MODEL	No.	Size (mm)	Marked	mbar	m³/h	mbar	m³/h
LNVx15	3	1.94	500	13.1	1.64	5.0	1.01
LNVx20	4	1.94	500	12.3	2.17	6.0	1.49
LNVx25	5	1.94	500	13.5	2.75	6.5	1.92
LNVx30	7	1.94	500	10.7	3.44	5.2	2.37
LNVx35	5	2.26	580	13.2	3.86	6.8	2.76
LNVx40	8	1.94	500	12.3	4.29	6.0	2.98
LNVx45	7	2.54	750	7.4	4.97	3.5	3.43
LNVx50	7	2.54	750	9.5	5.77	4.5	3.96
LNVx60	8	2.54	750	10.0	6.98	5.2	4.77
LNVx70	10	2.54	750	9.4	8.10	4.6	5.60
LNVx90	8	3.5	1500	5.5	10.32	3.0	7.58
LNVx120	10	3.5	1500	6.7	13.44	3.3	9.61
LNVx140	12	3.5	1500	6.2	15.45	2.9	10.7

Nominal Inlet Pressure = 20mbar

Minimum Inlet Pressure = 17.5mbar

1.3 General Requirements

1.3.1. Related Documents

All LNVx heaters comply with the following European Directives:

Gas Appliance Regulation: **2016/426EC**
Electromagnetic Compatibility Directive: **2014/30/EU**
Low Voltage Directive: **2014/35/EU**
Machinery Directive: **2006/42/EC**
Ecodesign Directive (ErP): **2009/125/EC***

Air heater(s) must be installed in accordance with **BS6230** and **BS5440** plus any relevant requirements of local and national building codes. * *where appropriate.*

1.3.2 Location

Powrmatic LNVx units are designed to operate within an ambient temperature range of -10 to 25°C.

LNVx heaters can be installed in several ways: i) suspended from 'drop rods' via purpose designed M10 suspension fixing points on the heater, ii) attached to our optional wall support brackets or iii) positioned on a level, non-combustible base. In all cases, it is important that all supporting structures have been assessed with regard to the relevant weight loadings.

Consideration should be given to flue routes and points of exit, gas, electrical and control connections. Consideration should also be given to the throw characteristics of the heater, issues of public access and siting of environmental control stations and/or remote temperature sensors where the position needs to be representative of the zone temperature to which they refer.

Where the location of the air heater is such that it might suffer external mechanical damage e.g. from overhead cranes, fork lift trucks, it must be suitably protected.

Heaters should not be installed in hazardous areas or areas where there is a foreseeable risk of flammable or corrosion inducing particles, gases or vapours being drawn into the combustion air or main fan circuits.

Areas where special consideration or advice may be required could include but is not limited to –

- Where de-greasing solvents are present, even in minute concentrations
- Where paint spraying is carried out

- Where styrenes or other laminating products are used
- Where airborne silicone is present
- Where petrol engine vehicles are stored or maintained
- Where dust is present (i.e. wood working or joinery shops)
- Where high levels of extract persist.

Installation in such areas may be possible under specific conditions. Please consult our Technical Department for further information.

1.3.2.1 Sizing of the heater

The heater should be correctly sized for the area that it is heating, Full calculations need to be preformed to ensure the correct KW output heater is fitted (CIBSE elemental methodology can be used, or the Powrmatic Technical Department can provide guidelines).

1.3.3 Electrical Supply

Wiring external to the air heater must be installed in accordance with the I.E.E. Regulations for Electrical Installations and any local regulations which apply.
All standard heaters are supplied by 230V - 1ph, 50Hz.
The method of connection to the main electricity supply must:-

- facilitate the complete electrical isolation of the unit(s) via a suitable fused isolator (see section 2.4.5 for ratings)
- be in a readily accessible position adjacent to the unit(s)
- serve only the unit(s)
- have a contact separation of at least 3mm in all poles.
See the accompanying wiring diagram for the heater electrical connections

LNVx CCF and fan/silencer units can also be supplied for 400V 3N, 50Hz.

1.3.4 Gas Supply

A servicing valve and union to facilitate servicing must be fitted to the gas inlet pipe work of the heater. The gas supply must be completed in solid pipe work and be adequately supported.

Heaters suspended by drop rods, straps or chains must have a flexible connection as the final link between the gas supply pipe work and the heater. Sufficient slack must be left in the connection to take account of normal movement of the heater.

WARNING: When completing the final gas connection to the heater do not place undue strain on the gas pipe work of the heater.

1.3.4.1 Service Pipes

The local gas undertaking should be consulted at the installation planning stage in order to establish the availability of an adequate supply of gas to suit the building requirements. An existing service pipe must not be used without prior consultation with the local gas undertaking.

1.3.4.2 Meters

An existing meter should be checked, preferably by the gas undertaking, to ensure that the meter is adequate to deal with the total rate of gas supply required by all connected equipment.

1.3.4.3. Installation Pipes

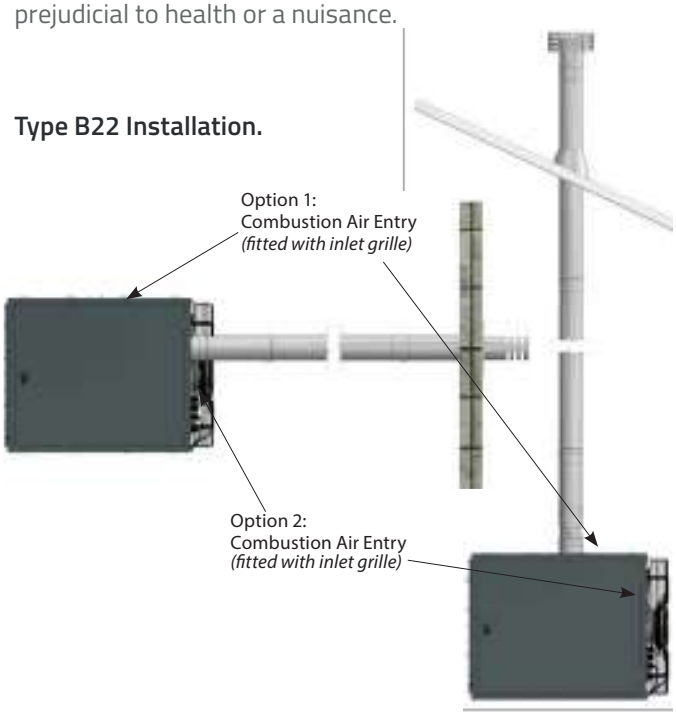
Installation pipes should be fitted in accordance with IGE/UP/2. Pipe work from the meter to the air heater must be of adequate size.
Do not use pipes of a smaller size than the inlet gas connection of the heater.
The complete installation must be tested for soundness as described in the above Code.

1.3.5 Flue System

Only flue systems supplied through Powrmatic Ltd may be used with LNVx units. Several configurations of flue and combustion air ducts are available.

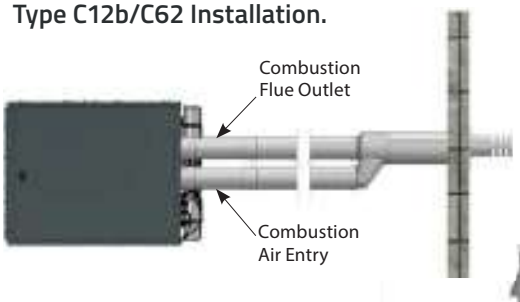
The flue must terminate in a freely exposed position and be sited to prevent the products of combustion entering any opening in a building in such concentration as to be prejudicial to health or a nuisance.

Type B22 Installation.

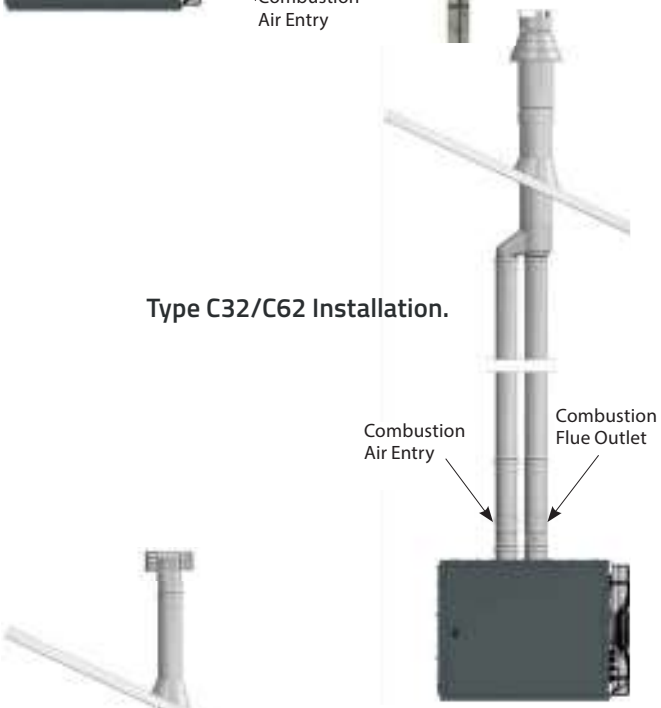


1.3 General Requirements

Type C12b/C62 Installation.

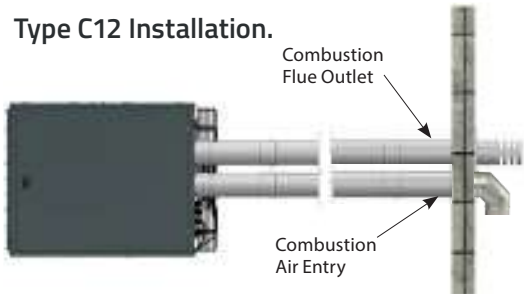


Type C32/C62 Installation.



Type C52 Installation.

Type C12 Installation.



1.3.6 Ventilation Requirements

Type B flued installations.
Where LNVx heaters are **installed within the heated space (ie not in a plant room or an enclosure)** and having a building design air change rate of greater than 0.5/h, additional provision for ventilation is **not required.**

If the building design air change rate is **less than** 0.5/h, additional provision for natural or mechanical ventilation **is required.** These being:

- Natural Ventilation:

Grilles having a free area of at least 2cm² per kW of rated heat input shall be provided at low level i.e. below the level of the heater flue connection.

- Mechanical Ventilation:

Must ensure that the space air change rate is at least 0.5/h, must be of the 'input' type and interlocked to ensure the heaters cannot work if the input system is not working.

Type B flued installations.
Where LNVx heaters are **installed in a plant room or an enclosure (i.e. not within the heated space)** having combustion air drawn directly from the room and connected to a flue that evacuates the products of combustion directly from the room additional provision for natural or mechanical ventilation **is required.**

These being:

- **Natural Ventilation:**

There must be permanent air vents communicating directly with the outside air, at high level and at low level.
Plant Rooms
Low level (inlet) 4cm²/kw of total rated net heat input
High level (outlet) 2cm²/kw of total rated net heat input
Enclosures
Low level (inlet) 10cm²/kw of total rated net heat input
High level (outlet) 5cm²/kw of total rated net heat input

- **Mechanical Ventilation:**

The minimum flow rate of ventilation shall be 4.14m³/h per kilowatt of total rated heat input.

Type C flued installations.
Where LNVx heaters are **Installed within the heated space (i.e. not in a plant room or an enclosure)** having combustion air ducted to the appliance and combustion products ducted to the outside air**, NO additional provision for the supply of either combustion air or for combustion products dilution or additional provision for the supply of air is necessary.**

Type C flued installations.
Where LNVx heaters are **installed in a plant room or an enclosure (i.e. not within the heated space)** having combustion air ducted to the appliance and combustion

products ducted to the outside, **air vents shall be provided and be permanently open.**

To room or internal space
Low level (inlet) 10cm²/kw of total rated net heat input
High level (outlet) 10cm²/kw of total rated net heat input

Direct to outside air
Low level (inlet) 5cm²/kw of total rated net heat input
High level (outlet) 5cm²/kw of total rated net heat input.

1.3.7 Air Distribution System

Where LNVx F units are required to cover a large floor area, and in buildings with high roof or ceiling heights Calecon thermal economiser units may be considered to ensure even heat distribution and minimise stratification. Care should be taken to avoid impeding the air throw with racking, partitions, plant or machinery etc. Various outlet configurations are available as optional extras to modify the air throw pattern to suit particular site conditions.

If necessary, suitable barrier rails should be provided to prevent any combustible material being placed within 900mm of the outlets.

1.3.7.1 Ducting Requirements

IMPORTANT. Ductwork must comply with current regulations and be correctly calculated to comply with the maximum static resistance available for the specific model installed (refer to the following duct resistance vs air volume tables).

Ensure that the total aggregate resistance[1] of the duct system, including any dampers, grilles or filters etc, is equivalent to the static pressure capability of the selected heater.

		Type B_{22} Installation (these refer to section 2.2 of these instructions) Air vents shall be permanently open. In all cases figures are per heater installed. For multi heater installations the appropriate values for each heater must be added together					**Type C_{12} or C_{32} Installation** (these refer to section 2.2 of these instructions) Air vents shall be permanently open. Figures are for heaters in plant rooms or enclosures ONLY In all cases figures are per heater installed. For multi heater installations the appropriate values for each heater must be added together.				
LNVx	**Input kW**	**In the heated space**	**In a plant room, ventilation to outside**		**In an enclosure, ventilation to outside**		**In the heated space**	**Ventilation is to a room or internal space**		**Ventilation is to a outside air**	
		Low level grille. Free area cm²	**Low level grille. Free area cm²**	**High level grille. Free area cm²**	**Low level grille. Free area cm²**	**High level grille. Free area cm²**	**Free area grille cm²**	**Low level grille. Free area cm²**	**High level grille. Free area cm²**	**Low level grille. Free area cm²**	**High level grille. Free area cm²**
15	15.5	31.0	62.0	31.0	155.0	77.5	n/a	155.0	155.0	77.5	77.5
20	20.5	41.0	82.0	41.0	205.0	102.5	n/a	205.0	205.0	102.5	102.5
25	26.0	52.0	104.0	52.0	260.0	130.0	n/a	260.0	260.0	130.0	130.0
30	32.5	65.0	130.0	65.0	325.0	162.5	n/a	325.0	325.0	162.5	162.5
35	36.5	73.0	146.0	73.0	365.0	182.5	n/a	365.0	365.0	182.5	182.5
40	40.5	81.0	162.0	81.0	405.0	202.5	n/a	405.0	405.0	202.5	202.5
45	47.0	94.0	188.0	94.0	470.0	235.0	n/a	470.0	470.0	235.0	235.0
50	54.5	109.0	218.0	109.0	545.0	272.5	n/a	545.0	545.0	272.5	272.5
60	66.0	132.0	264.0	132.0	660.0	325.0	n/a	660.0	660.0	330.0	330.0
70	76.5	153.0	306.0	153.0	765.0	382.5	n/a	765.0	765.0	382.5	382.5
90	97.5	195.0	390.0	195.0	975.0	487.5	n/a	975.0	975.0	487.5	487.5
120	127.0	254.0	508.0	254.0	1270.0	635.0	n/a	1270.0	1270.0	635.0	635.0
140	146.0	292.0	584.0	292.0	1460.0	730.0	n/a	1460.0	1460.0	730.0	730.0

1.3 General Requirements

Model	Air Volume m³/h	Maximum Duct Resistance (Pa)
LNVx15CCF	1500	220
LNVx20CCF	2020	320
LNVx25CCF	2800	220
LNVx30CCF	3490	220
LNVx35CCF	4000	200
LNVx40CCF	4250	150
LNVx45CCF	5450	250
LNVx50CCF	5450	250
LNVx60CCF	6600	250
LNVx70CCF	7000	250
LNVx90CCF	10100	180
LNVx120CCF	12800	290
LNVx140CCF	13500	250

If the total static resistance of the duct system is greater than the stated for that heater, airflow will be restricted and the heater may trip to overheat. Resistance must be reduced to avoid nuisance temperature overheat conditions. Conversely if the duct system resistance is insufficient, then the main fan motor may draw excess current and trip to overload. Additional resistance must be introduced to stop the fan motor from 'free-wheeling' and eventually causing an electrical thermal trip condition. (e.g. by adjustment of duct outlet nozzles and balancing of the duct system).

Using a clamp meter around the fan power cable and with any fan mixing/plenum panels fitted, check the running current of the centrifugal fan once the heater is running and compared with the table shown in section 2.6.6.4.

Adjust the balancing dampers within the airflow ductwork system to achieve the current suitable for that specific model.

WARNING: DO NOT EXCEED THE STATED MAXIMUM. Exceeding the MAX running current will cause the fan's thermal overload to trip!

CAUTION: Furthermore, a 2000mm (2M) straight plenum box with the same cross sectional area as the heater outlet duct spigot, must be fitted to outlet spigot prior to any restriction[2] in ductwork.

WARNING: Failure to install this plenum box could cause excess temperatures issues with the heater and nuisance overheats.

It is recommended that the plenum should be connected to the heater outlet spigot via an airtight flexible coupling of non-combustible material.

If required sound attenuators may be fitted in inlet and outlet ducts to reduce airborne fan noise. Materials used in outlet sound attenuators must be capable of withstanding 100°C air temperature without any deterioration.

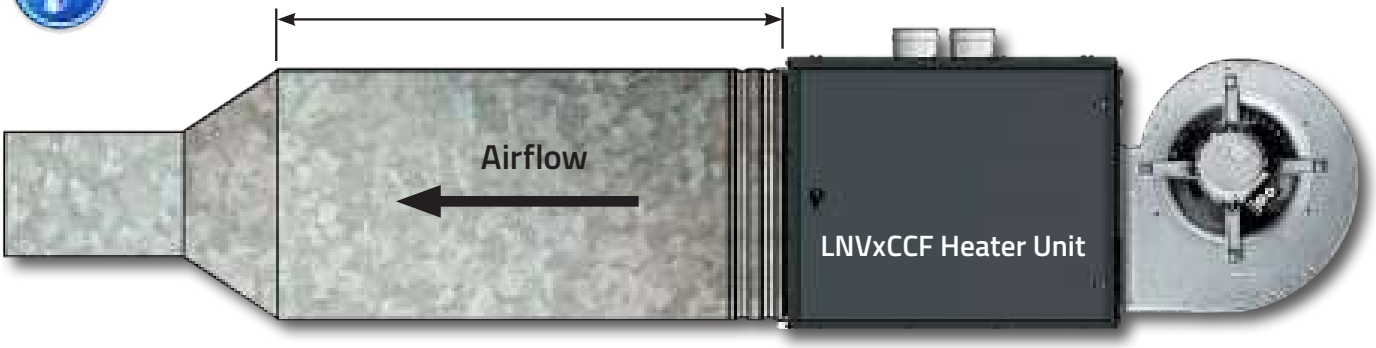
All ducting must be independently supported of the air heater. Joints and seams of supply ducts and fittings must be securely fastened and made airtight.

All delivery and return air ducts, including air filters, jointing and any insulation or lining must be constructed entirely of materials which will not contribute to a fire, are of adequate strength and dimensionally stable for the maximum internal and external temperatures to which they are to be exposed during commissioning and normal operation. Where inter-joist spaces are used as duct routes they should be suitably lined with a fire-resisting material.

A full and unobstructed return air path to the air heater(s) must be provided. Care must be taken to ensure that any return-air intakes are kept clear of sources of smells and fumes, and where there is any possibility of pollution of the air by dust, shavings etc., precautions must be taken to prevent contamination.

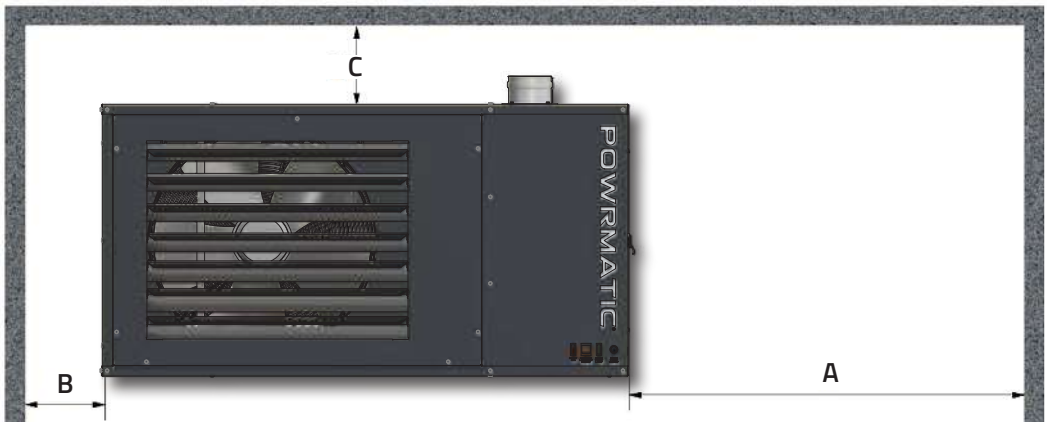
[1] inlet ducting and outlet ducting. [2] in respect to reducer, bend or bi-directional section

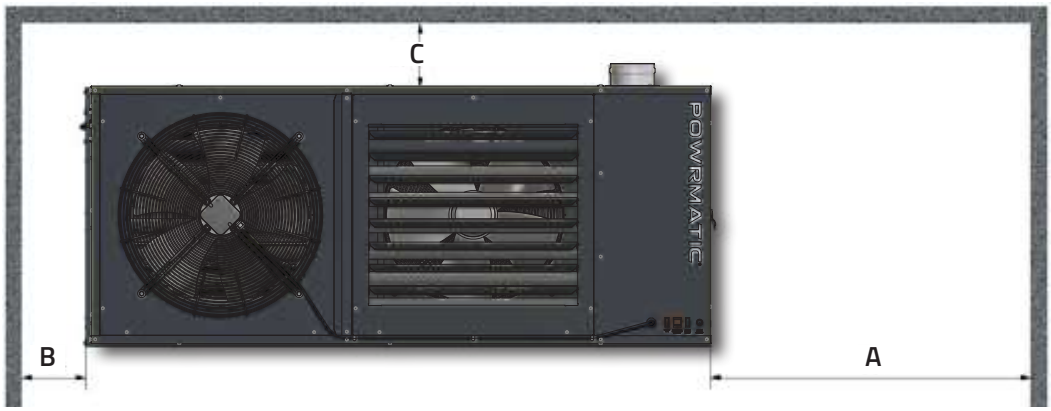
IMPORTANT. It is essential that a minimum 2000mm of straight ductwork, with the same cross sectional area as the heater outlet be connected to the heater prior to any restriction



2.1.1 Fitting space requirement

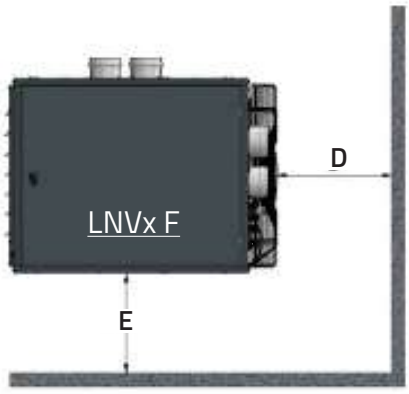
LNVx F / CCF
Front View

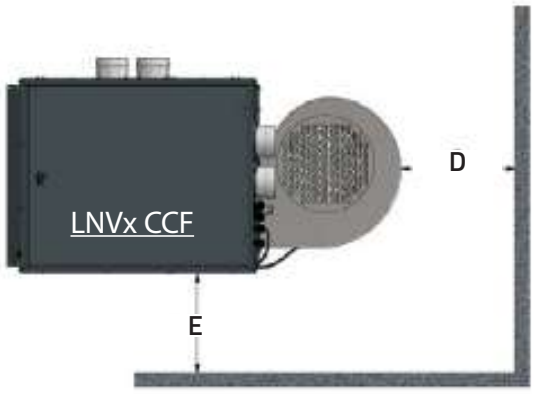




LNVx Duo
Front View

R/H Side Views





R/H Side Views

2.1 Fitting the Unit

Distance from outside of heater to closest obstacle				Distance
A	RHS Clearance (when viewed at front of heater)		mm	1000
B	LHS Clearance (when viewed at front of heater)		mm	200
C	Top of heater		mm	200
D	Rear of heater (dependent on flue system)		mm	400
E	Recommended mounting heights (floor level to underside of unit)	LNVx15F-30F / Duo	M	2.5-3.0
		LNVx35F-40F / Duo	M	2.5-3.5
		LNVx45F-140F / Duo	M	3.0-5.0
		LNVx15V	M	2.5-3.0
		LNVx20-30V	M	4.0-6.0
		LNVx35-40V	M	4.0-7.0
		LNVx45-70V	M	5.0-8.0
		LNVx90V	M	6.0-10.0
		LNVx120/140V	M	6.0-12.0
For multi air heater installations the following minimum distances between units must be observed				
	Between units, side to side/back to back		M	3.0

Note: All models must not be installed at a height of less than 2.5m to the base of the unit.

Note: For LNVx D units the normal air flow direction is from right to left when viewing the heater from the burner/controls end with the fan unit upstream.

Note: The minimum clearances must be observed for installation and servicing.

Warning: Any combustible material adjacent to the air heater and the flue system must be so placed or shielded as to ensure that its temperature does not exceed 65 °C.

Warning: When LNVx modular components are used in conjunction with the heater each component must be individually supported.

Note: The access door to the controls section may be removed to improve access. Open the door to 90°, remove the earth cable at the bottom, and then lift the door vertically upwards to disengage the hinge plates. Refit in reverse order. Ensure that the earth cable is refitted.

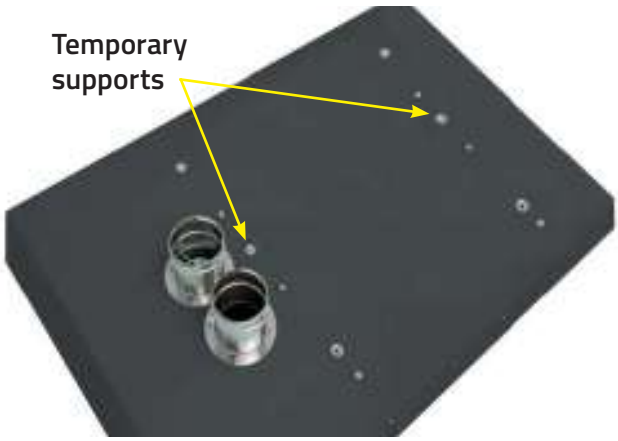
2.1.2 Suspending the heater

The air heater may be installed either:
a) suspended from suitable vertical drop rods (recommended maximum length is 1.8m).
b) on specifically designed cantilever brackets from a non combustible wall.
c) on a level noncombustible surface. The surface must not extend past the front edge of LNVx F heaters.

The method of installation must be capable of adequately supporting the weight of the unit (See section 1.2) and any ancillary equipment. Before installing the heater the existing structure must be inspected to ensure it is suitable. All supports should be protected against the effects of rust or corrosion.

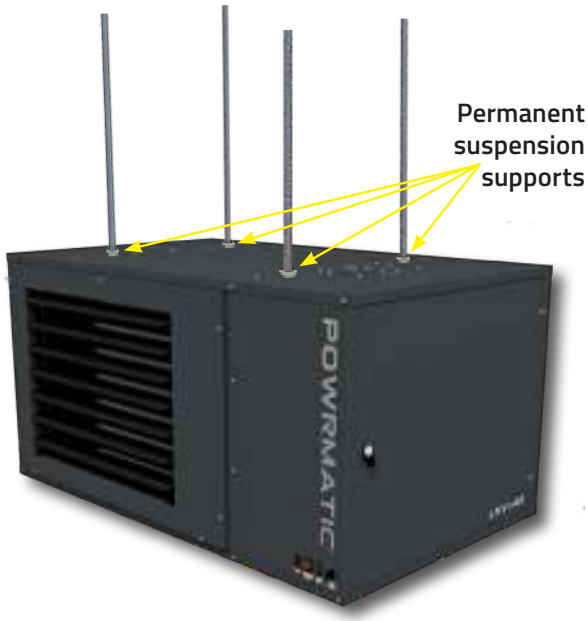
Raise the heater up to the point of installation using suitable and safe means and connect to the means of suspension.

Note: Each heater is provided with additional central suspension points (suspension points running along the front and back are for permanent connection, suspension points running left to right in the centre are for temporary support) that can be used to provide temporary support, using suitable means, whilst the unit is being installed. Under no circumstances must these points be used as the final means of suspension.



Threaded drop rods must have lock nuts fitted that are tightened down onto the 10mm fixings in the heater.

Recommended maximum drop rod length is 1.8m.



If reducing noise levels is important the heater should be insulated from the structure by installing it on suitable anti-vibration mountings. In all such cases and when the heater is suspended it is essential that all gas, duct, and electrical connections to the heater are made with flexible connections to maintain continuity of connection.

2.1.3 Air Distribution System

2.1.3.1 General

LNVx Duo discharges air in two directions, significantly enhancing the effective coverage of the heater and leading to a more even warmth distribution especially within modern well insulated buildings. This in-turn offers a potential saving on both capital and installation costs.

LNVx D and LNVx CCF models are designed for use with duct work to more precisely define the point of air delivery, and /or provide ducted return air or ducted fresh air inlet. All ducting must be independently supported of the air heater. Joints and seams of supply ducts and joints between LNVx ancillary components must be securely fastened and made airtight using appropriate sealants or sealing strips. If required the duct work should be insulated to reduce heat loss.

2.1.3.2 Noise Reduction

Ducting should be connected to the heater spigots via an airtight flexible coupling of noncombustible material.

Before fitting the coupling it must be ensured that a minimum clearance of approximately 15mm will be maintained between the ends of the ducting and the heater spigots.

Sound attenuators may be fitted in inlet and outlet ducts to reduce airborne fan noise. If sound attenuators are used then these must be factored into the total static resistance of the ductwork. Materials used in outlet sound attenuators must be capable of withstanding 100°C air temperature without any deterioration.

2.1.4 Room Thermostat Siting

The room thermostat should be fitted at a point which will be generally representative of the heated area as far as temperature is concerned. Draughty areas, areas subjected to direct heat e.g. from the sun, and areas where the air movement is relatively stagnant e.g. in recesses, should be avoided. The thermostat should be mounted approximately 1.5m from the floor.

Any room thermostat, frost thermostat, time clock etc. must be suitable for switching 230V, 5A and must be of the 'snap action' type to minimise contact bounce.

For electrical connections of external controls see section 2.5 or the accompanying wiring diagram.

2.2 Flue/Combustion Air Duct System

The minimum distance between surfaces of the flue pipe and any surfaces made from combustible materials is 300mm. If it is necessary for the flue pipe to pass through a structure made from combustible materials a metal sleeve must be used so that the minimum clearance of 300mm is maintained.

The flue and combustion air ducts supplied with the heater are capable of withstanding their own weight over the allowable flue lengths. Wall bands and bracing brackets, or equivalent, must be used to provide lateral stability and should be used at centres not exceeding 2.5 metres.

All models are supplied as standard with a rear flue outlet and the flue outlet and combustion air sockets temporarily fitted.

2.2.1 Conversion to Top Flue Outlet

Type C32
1a. Remove the two blanking plates from the flue / combustion air openings on the underside of the top panel by removing 8 screws. Remove exhaust fan outlet spigot and the air inlet spigot from the rear panel.

Type B22
1b. Remove the blanking plate from the flue opening on the underside of the top panel by removing 4 screws. Remove exhaust fan outlet spigot from the rear panel.

All
2. Remove the vacuum sensing tube from the original test point connection and replace with the black cap from the unused test point connection.

3. Remove the screws securing the fan mounting box to the exhaust header plate and remove fan assembly. Ensure that the gasket is not damaged, if necessary replace or make good with silicon sealant.

4. Rotate fan assembly 90° anticlockwise and refit the fan assembly to the exhaust header plate utilising the original screws. Reconnect the vacuum sensing tube onto the new test point location.

5. Secure the exhaust fan outlet flange to the underside of the top panel and refit the blanking plate(s) and flue spigot(s).

2.2.2. Fitting Flue/Combustion Air Sockets

1. Apply a bead of silicon sealant around the face of the flange on the exhaust fan outlet tube that can be seen from the outside of the heater. Place the flue socket on the outside of the heater to mate with this flange and clamp the two flanges together, on either side of the heater panel using the screws provided. Ensure that the silicon sealant has sealed between the two flanges.

2. Apply silicon sealant and refit blanking plates as required to seal unused panel holes.

2.2.3. General Requirements

See Figures 1a to 2b for the different types of flue installation. In all cases the flue outlet socket must be connected via the provided flue system to outside air.

The maximum permitted length of flue system is 6m, or 12m if the flue outlet only is used. If an offset is required two sets of 45° bends should be used each set being equivalent to 0.5m of flue length. 90° bends may be used but each set will be equivalent to 1.0m of flue length.

All outer joints must be finished with the provided locking bands. A smear of silicon grease to the inside of sockets will assist in fitting components together. All flue and combustion air ducts must be supported independently of the air heater.

Note: For flue positioning and minimum clearances of flue, please refer to current IGE/UP/10, BS5440-1 and BS5440-2 standards.

2.2.4. Installation of Flue System

Note: A terminal guard, as supplied by Powrmatic Ltd, must be fitted to horizontal flue terminals.

Notes for all systems.
i) Final overall length of adjustable disconnection piece must be between 360 - 415mm.
ii) 45° offsets may be used if required. Each set is equivalent to 0.5m of flue length.
iii) Where LNVx heaters are used in clean environments it is permissible to take the combustion air directly from the heated space.

2.2.4.1. Horizontal System - Rear Outlet

Note: If the outlet is required to the side of the unit 90° bends may be fitted directly onto the inlet/outlet spigots on the heater.

1. Locate the position of the flue terminal, allowing for a slight gradient running down from the heater to the terminal of 2° - 3° and cut a hole to suit.

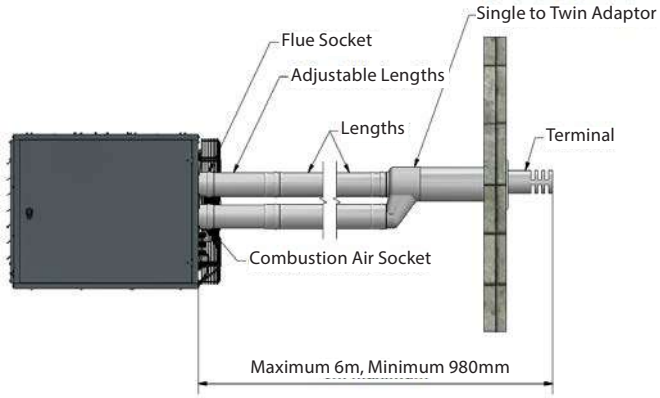
2. Fit the flue terminal, securing via the wall plate and weather with silicon sealant or similar.

3. Fit the twin to concentric adapter to the terminal section and extend the flue and combustion air ducts to the heater using straight lengths.

Fit an adjustable length prior to the unit, to facilitate flue disconnection for servicing. Extend the adjustable lengths to make the final connection to the appropriate heater inlet/outlet spigots.

4. Ensure that internal silicon sealing rings are in place and that all tubes are pushed fully home. Secure concentric lengths with the locking bands provided.

Fig 1a. Individual system - Type C12 horizontal



2.2.4.2. Vertical System - Top Outlet

1. Locate the position of the flue terminal cut a hole in the roof to suit.

2. Fit the flashing and the flue terminal so that the lower edge of the outer case is over the top of the flashing. Weather with silicon sealant or similar.
Fit a condensate drain length into the flue socket on the heater and an equivalent straight length onto the combustion air socket.

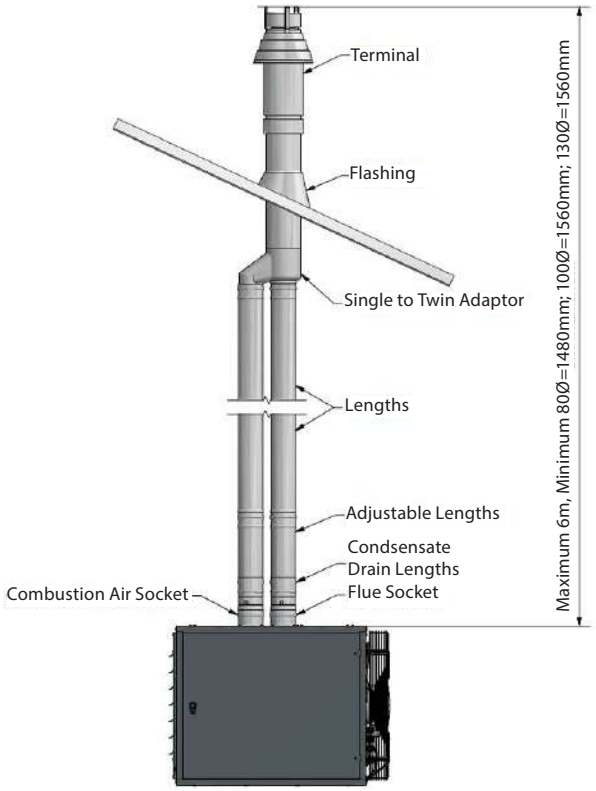
3. Fit the twin to concentric adapter to the terminal section and then extend down to the heater using straight lengths.

Fit adjustable lengths as the final connection pieces, to facilitate flue disconnection for servicing. Extend the adjustable lengths to make the final connection but do not exceed the maximum extended length so as to maintain joint integrity.

Extend the drainage off take of the condensate drainage length to a suitable gully or drain.

4. Ensure that internal silicon sealing rings are in place and that all tubes are pushed fully home. Secure concentric lengths with the locking bands provided.

Fig 1b . Individual system - Type C32 vertical



2.2.4.3. Internal Combustion Air System

1. Complete the run of flue sections from the terminal spigot to the flue outlet socket of the heater generally as described in 2.2.4.1. and 2.2.4.2., ensuring that the internal silicon sealing rings are in place.

2. It is recommended that both air inlets are utilized and that both are fitted with the mesh inlet plates supplied. In addition a 90° bend should be fitted to the rear inlet, the inlet opening of the bend facing to the side of the heater i.e. away from the main air fan.

Fig 2a. Exhaust only system -Type B22 horizontal

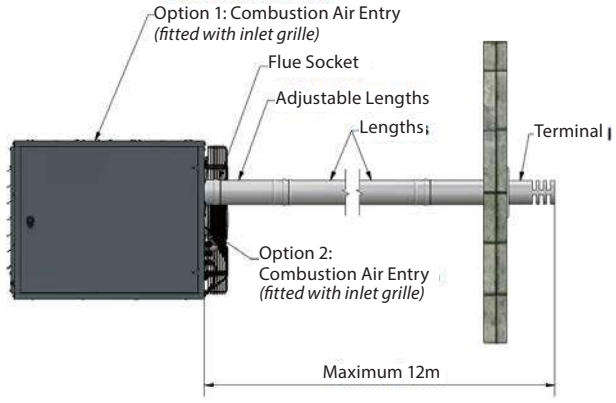
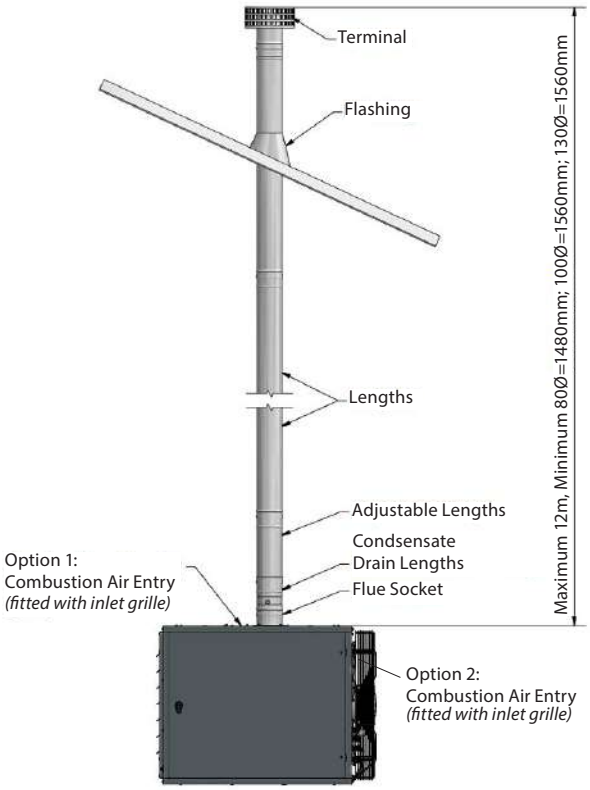


Fig 2b. Exhaust only system - Type B22 vertical

2.2 Flue/Combustion Air Duct System



2.2.5. Condense Length

We recommend installing an inline condense flue drain when flued vertically, due to the lower flue gas temperatures experienced when the heater is operating at low firing rates.

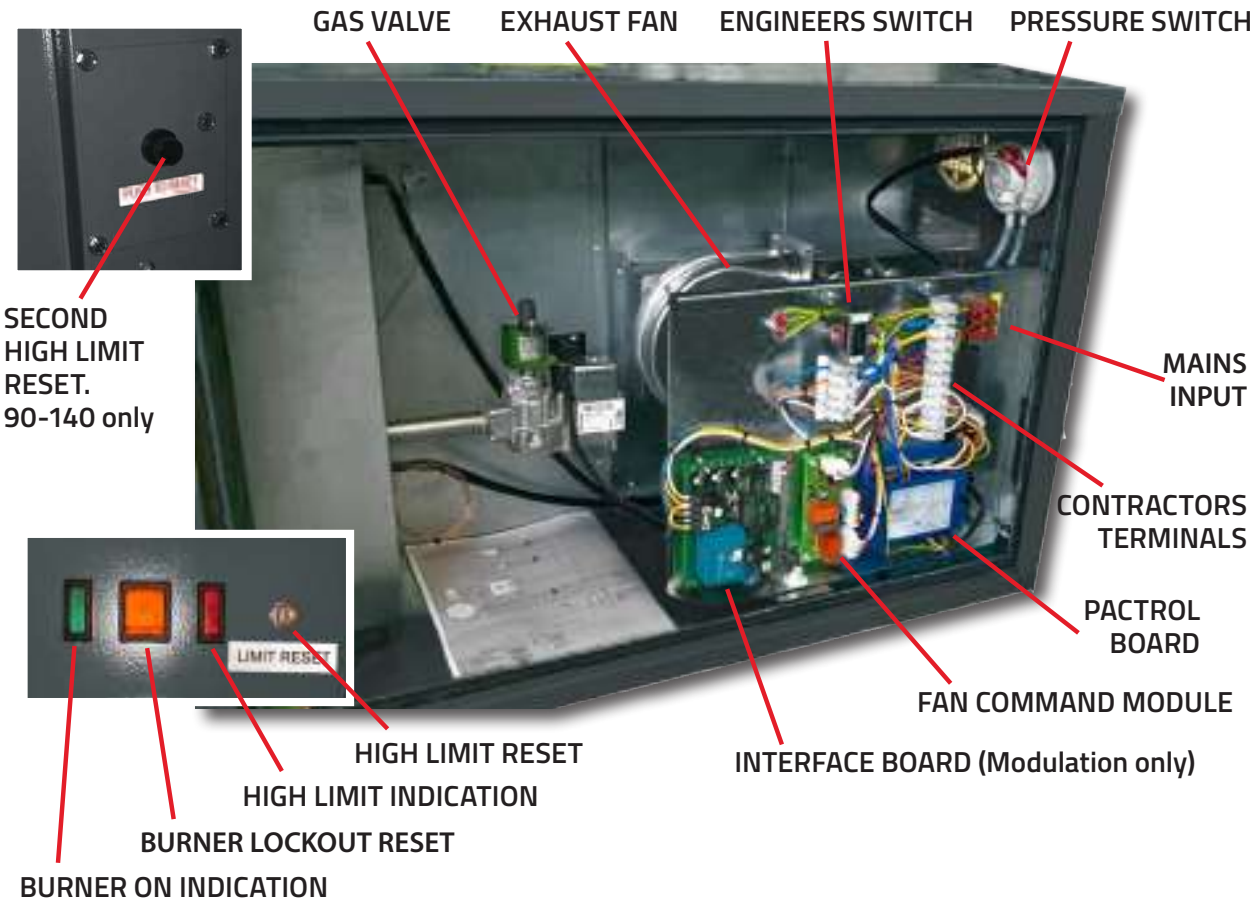
Other relevant factors include installations where significant length of the flue is used which may cause chilling, or if heater may be exposed to high winds and heavy rain, which may ingress the flue.

We would always recommend fitting the inline condense drain even if the drain point is capped, should the drain be required in the future. Any clarification can be achieved by consulting with Powrmatic.

The condensate drainage pipe should be run in a standard drain pipe material and have a fall of at least 2.5° in every 50m. Copper or copper based alloy shall not be used for condensate drains. See BS 6896.

Condensate drainage pipe should run and terminate internally to a soil and vent stack or a waste pipe. Alternatively, the condensate can be discharged into the rainwater system or a purpose-made soakway.

2.3 General Identification of Electrical Items



2.4.1. Electrical Connections

Warning: THIS APPLIANCE MUST BE EARTHED.

Warning: Lockout reset is by a switched Neutral to the controls in the heater.

Warning: Wiring external to the unit must be carried out by an appropriately qualified person to current IEE regulations for Electrical Installations and any local regulations which apply.

The local electrical supply must be run to a point adjacent to the heater and be suitably terminated to provide an isolation point that will prevent remote activation of the unit during servicing. Wiring should be completed in flexible conduit.

The local electrical supply conditions must be compatible with the electrical data given on the appliance data plate.

Heaters are for use with 230V, 1N, 50Hz supplies.

The method of connection to the main electricity supply must:-

- facilitate the complete electrical isolation of the heater(s) via a suitable fused isolator that will prevent remote activation of the heater during servicing (see section 2.4.5 for ratings).
- be in a readily accessible position adjacent to the heater(s).
- serve only the heater(s).
- have a contact separation of at least 3mm in all poles.

See section 2.5 or the accompanying wiring diagram for the heater electrical connections.

All units, (with the exception of units supplied with a centrifugal fan/silencer duct section) are fully prewired and only require final connections for the incoming mains supply and completion of the control circuit (230V).

Reference must be made to Section 2.4.5 to ascertain the electrical loading of the unit(s) being installed so that cables of adequate cross-sectional area are used for the electrical installation. The length of the conductors between the cord anchorage and the terminals must be such that the current carrying conductors become taut before the earth conductor if the cable or cord slips out of the cord anchorage. All external controls must be of an approved type.

Models supplied with a centrifugal fan/silencer duct section require wiring to be completed between the heater and fan. Refer to supplied wiring diagram.

Warning: LNVx D models supplied less fan must be electrically interlocked to the air movement system so that this is started in the same manner as the air heater fan would be. Refer to supplied wiring diagram.

Note: To achieve maximum system efficiency it is recommended that LNVx units are controlled by an MC200 or MC300 unit.

Simple room thermostat and thermostat/time clock control systems will not provide optimum system efficiency and fuel savings.

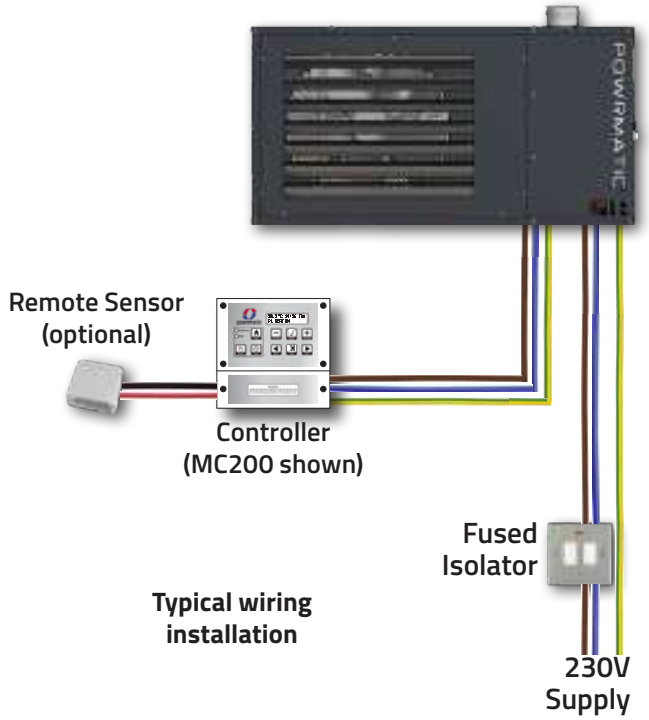
Wiring drawings and instructions are supplied with the respective controller.

2.4.2. Initial Wiring Installation

Key:

Mains supply	= 2 core and earth
MC200 Controller	= 8 core and earth
alt. MC300 Controller	= 6 core screened + LNE
Optional MC200 sensor	= Screened 2 core*

* (screen must be grounded only at the MC200, See instructions supplied with controller for wiring sizing, Max. 100m)



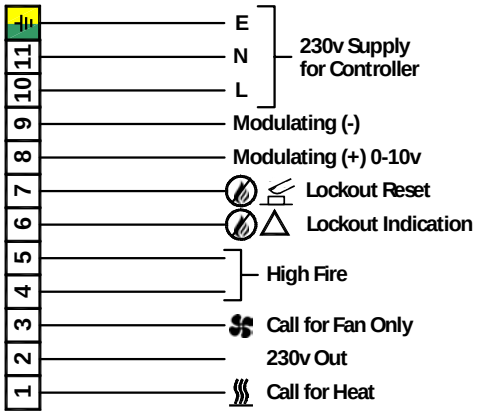
Typical wiring installation

2.4 Electrical Cable Installation

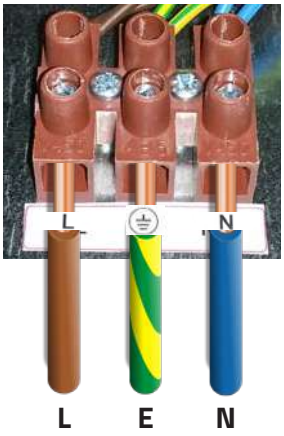
2.4.3. External Wiring

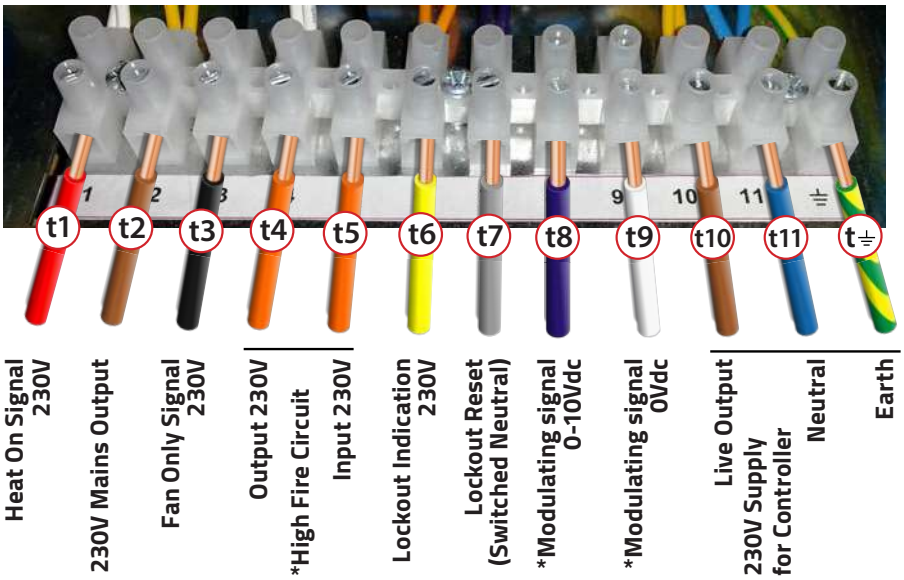
The wiring terminals are located on the electrical panel behind the side door of the heater which firstly has to be opened.

Mains input 230V 50Hz 1Ph supply connections are via a separate LNE terminal block. For input power refer to table below. Control circuitry / external control mains connections are via a numbered terminal strip. These being:



2.4.4. Wiring Connections





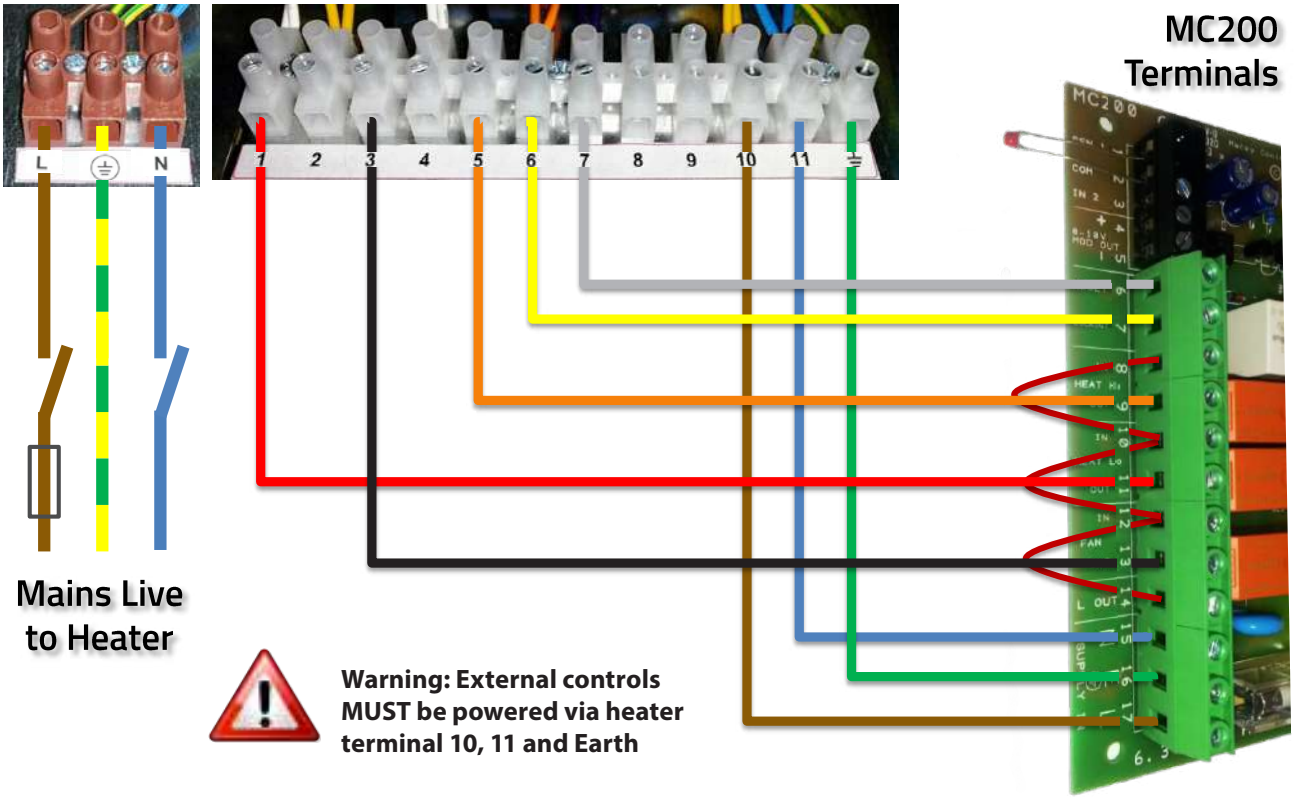
** when used*

2.4.5. External Fuses

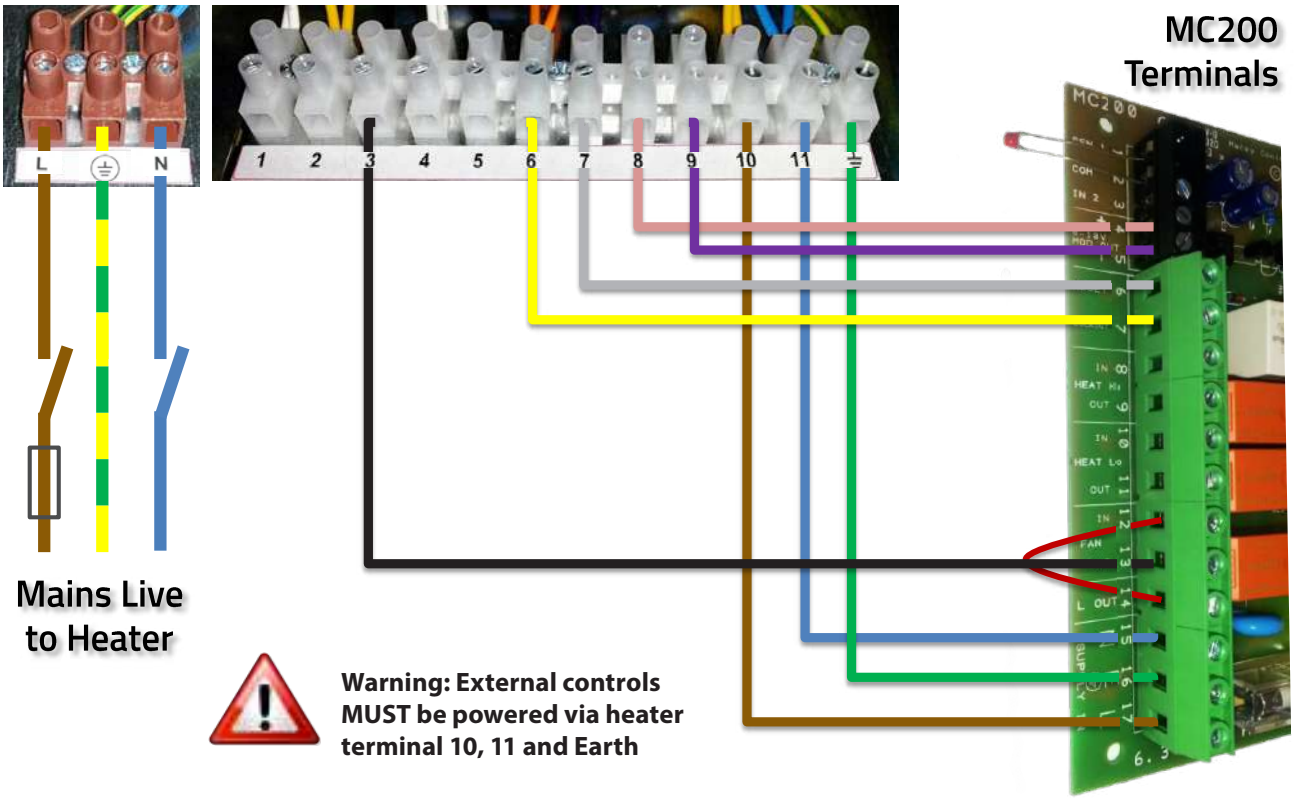
	F - Free Blowing Unit		CCF - Centrifugal Unit	
Model	Running Current (A)	Fuse/MCB Rating (A)	Running Current (A)	Fuse/MCB Rating (A) *(motor rated Protection Device)*
LNVx15	0.4	3 / 6	2.0	3 / 6
LNVx20	0.45	3 / 6	3.1	6 / 6
LNVx25	0.6	3 / 6	4.2	6 / 6
LNVx30	0.65	3 / 6	4.3	6 / 6
LNVx35	1.1	3 / 6	4.7	6 / 6
LNVx40	0.85	3 / 6	5.8	10 / 10
LNVx45	1.53	3 / 6	7.6	10 / 10
LNVx50	1.6	3 / 6	7.6	10 / 10
LNVx60	2.3	3 / 6	10.0 *(4.8)*	13 / 13 *(6 / 6)*
LNVx70	2.2	3 / 6	11.0 *(5.3)*	13 / 13 *(10 / 10)*
LNVx90	3.1	5 / 6	12.8	20 / 20
LNVx120	4.4	5 / 6	17.0 *(4.6)*	25 / 32 *(10 / 10)*
LNVx140	4.5	5 / 6	20.0 *(4.9)*	25 / 32 *(10 / 10)*

** 3 phase options shown in italics*

2.4.6. Interconnecting Wiring:
2.4.6.1. LNVx High / Low to Powrmatic MC200

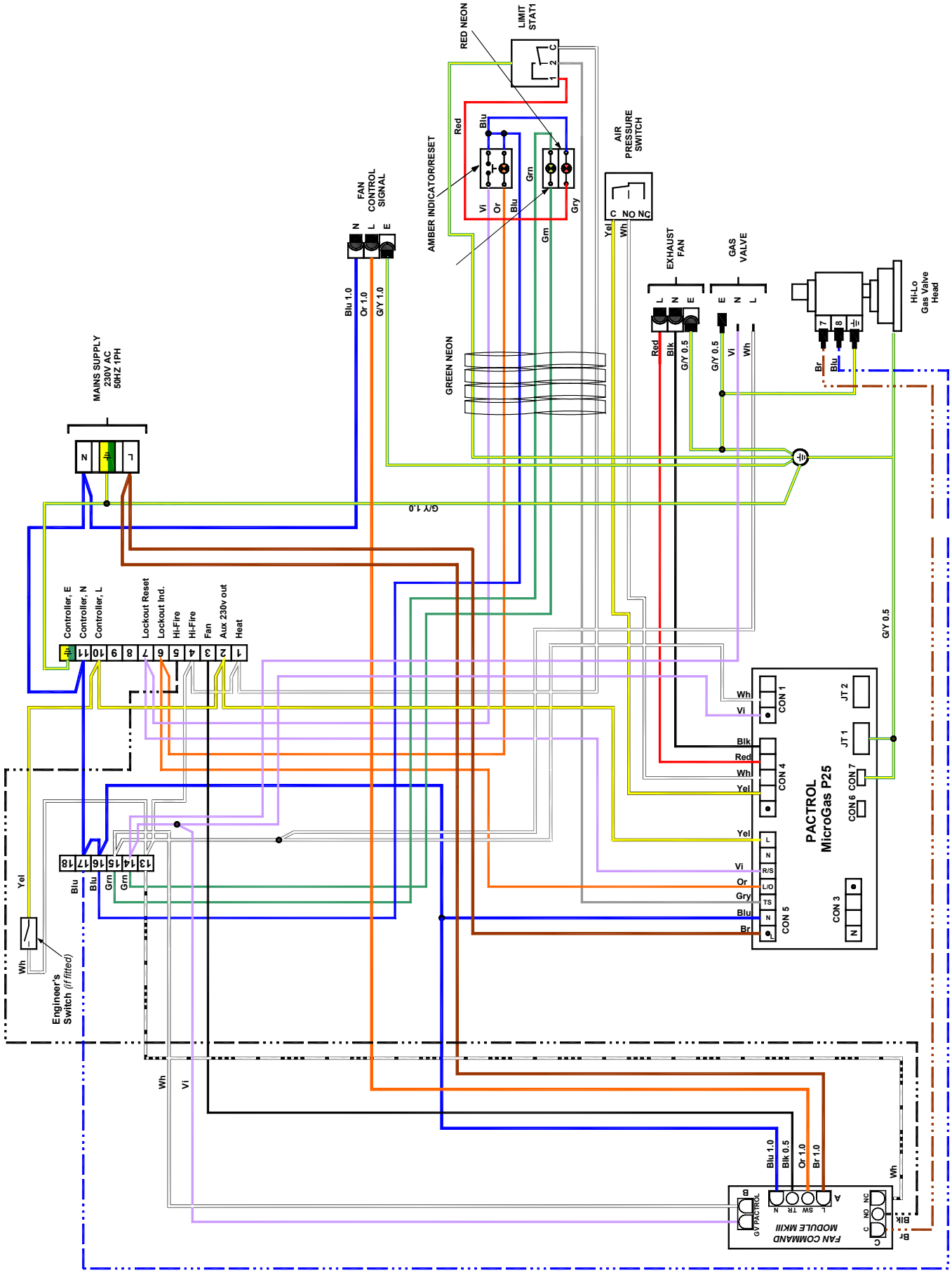


2.4.6.2. LNVx Modulation to Powrmatic MC200

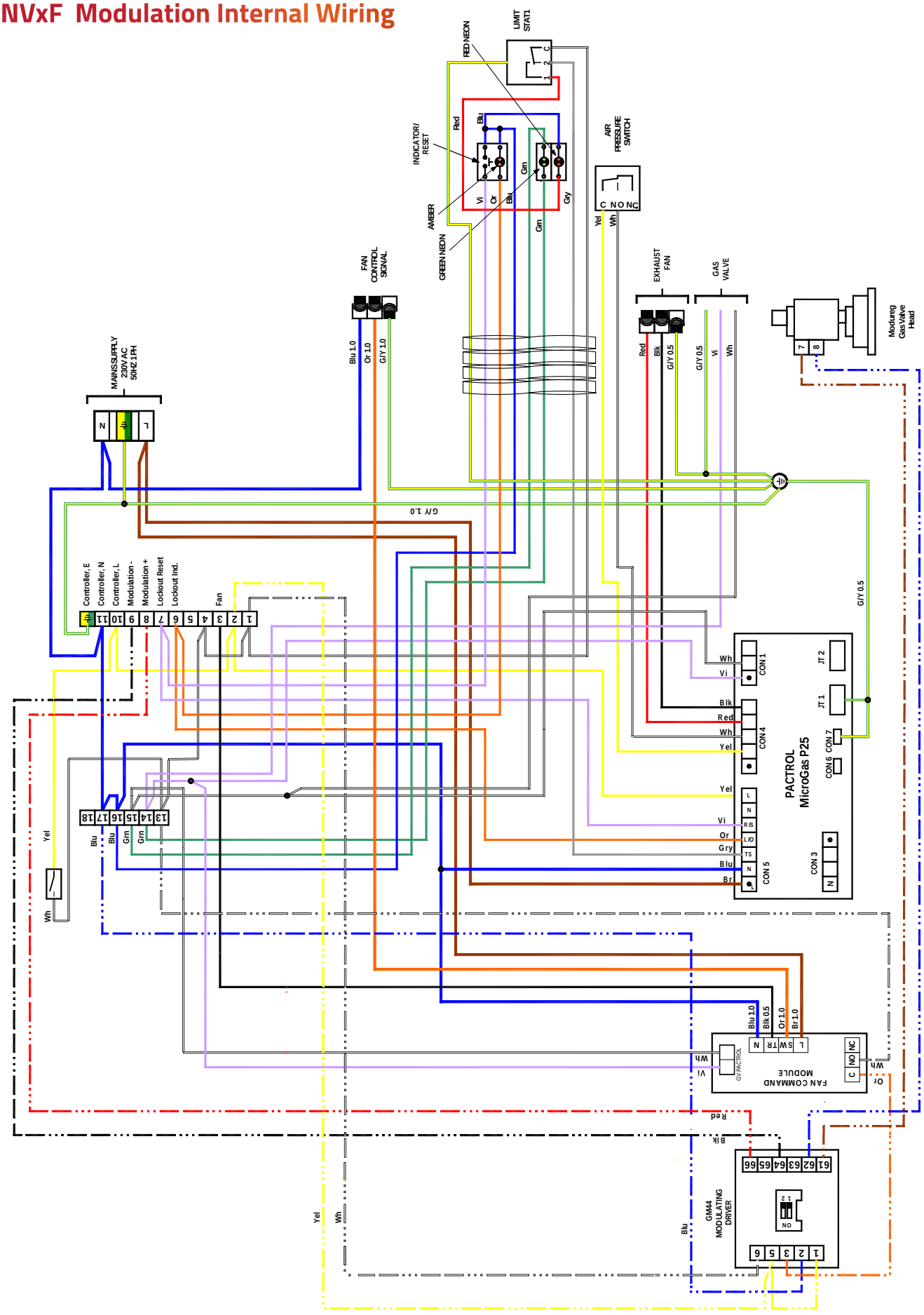


2.5 Wiring Diagrams

LNVxF High / Low Internal Wiring

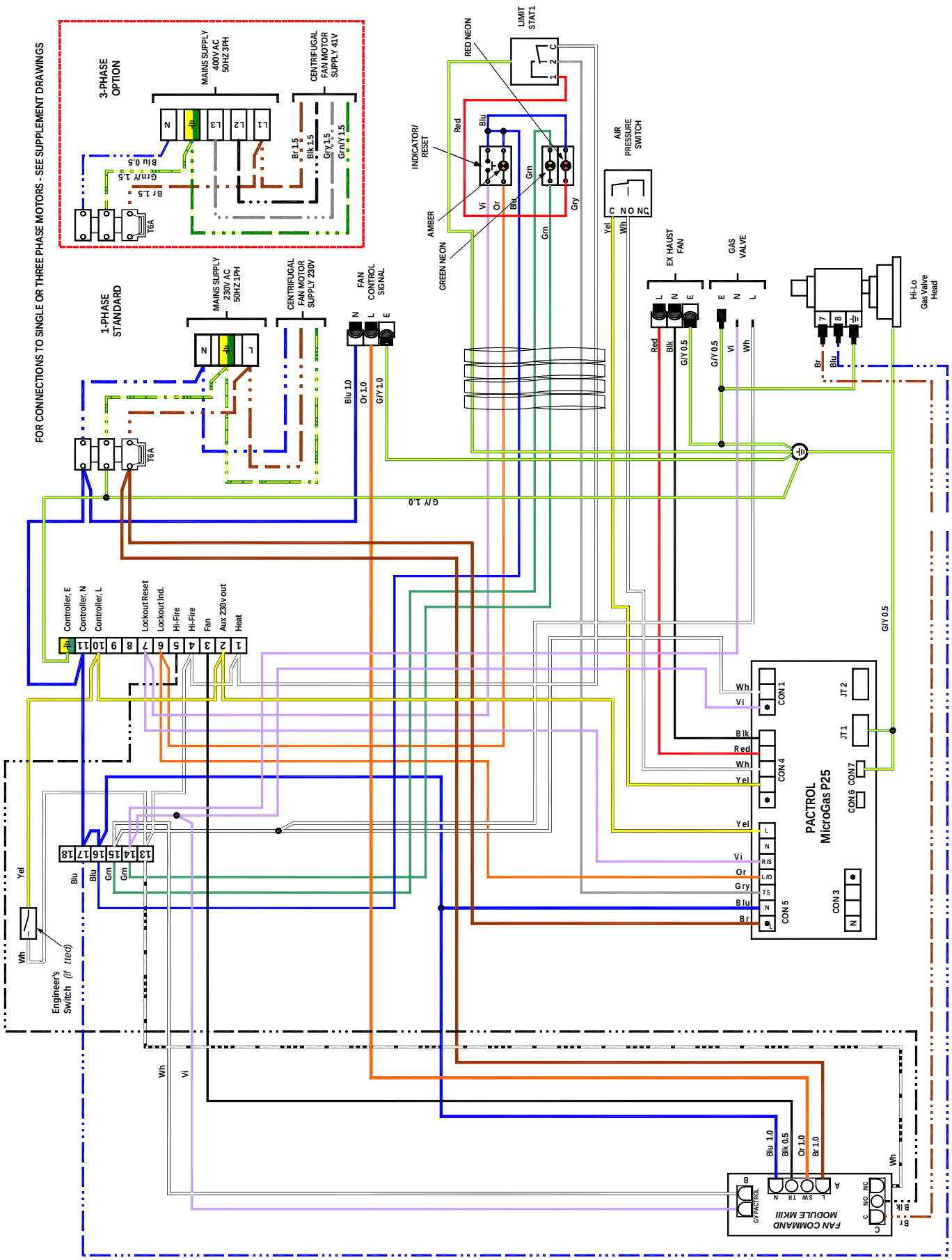


LNVxF Modulation Internal Wiring

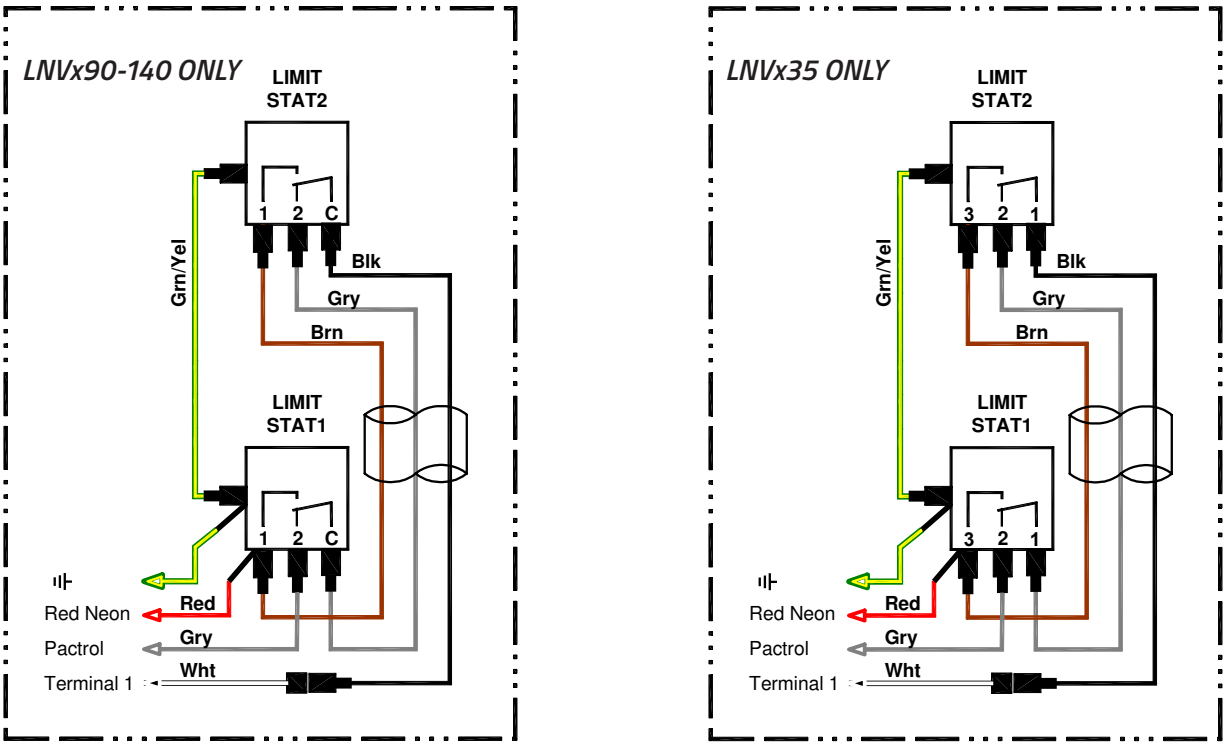


2.5 Wiring Diagrams

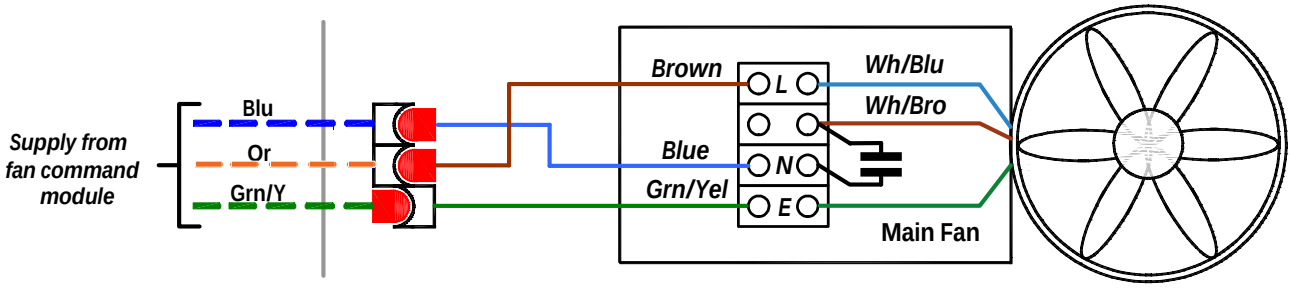
LNVx CCF High / Low Internal Wiring



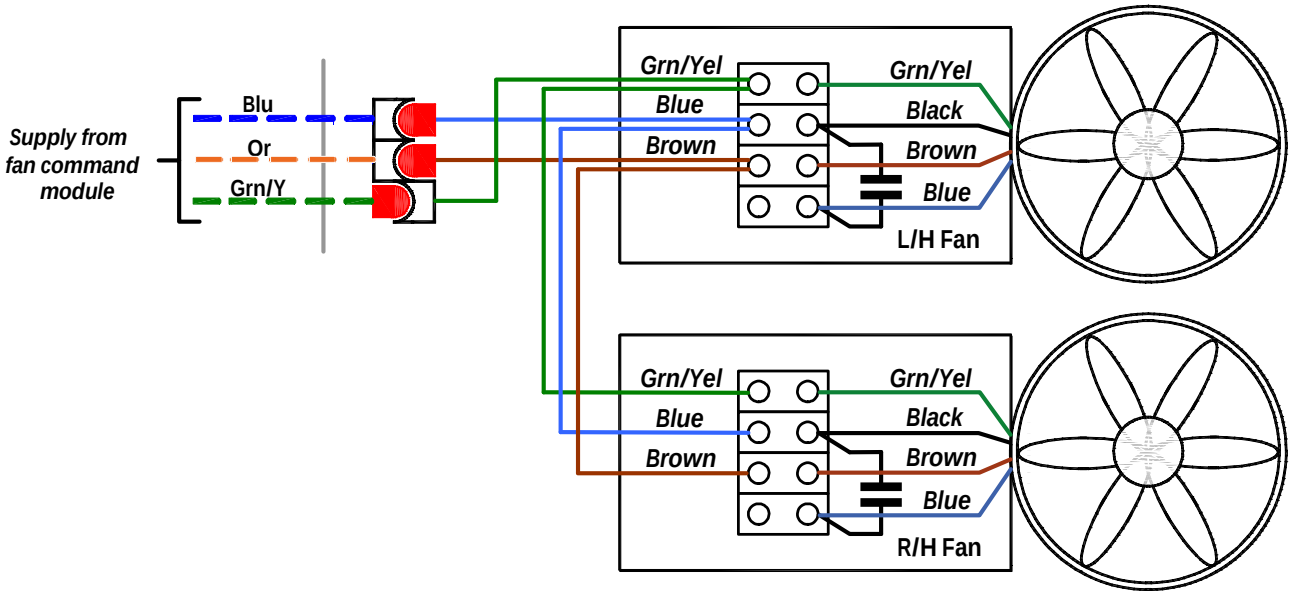
LNVx Twin Overheat Thermostat supplementary wiring



LNVxF 15, 20, 25, 30, 40 & 45 Axial Fan supplementary wiring

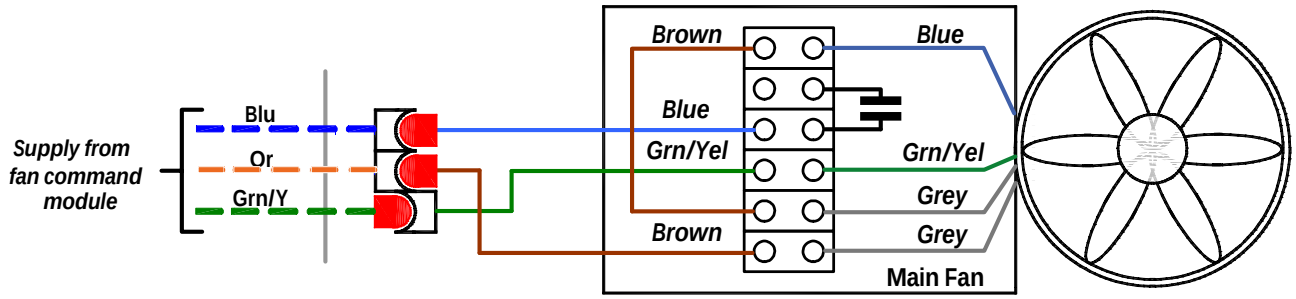


LNVxF 35 Axial Fan supplementary wiring

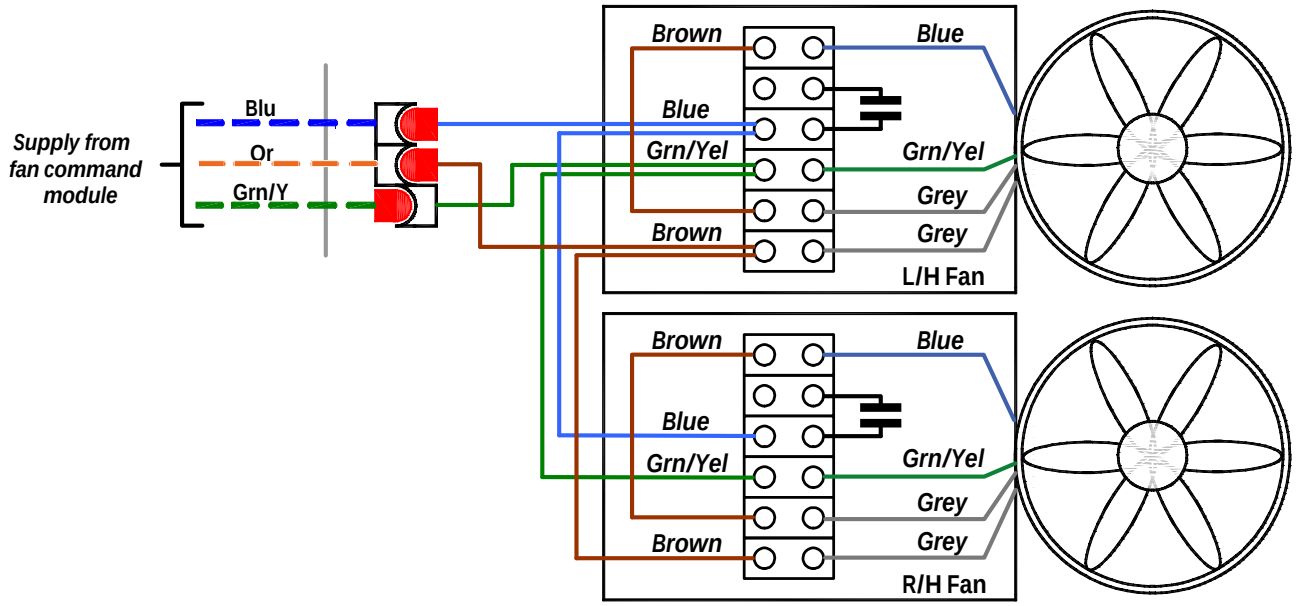


2.5 Wiring Diagrams

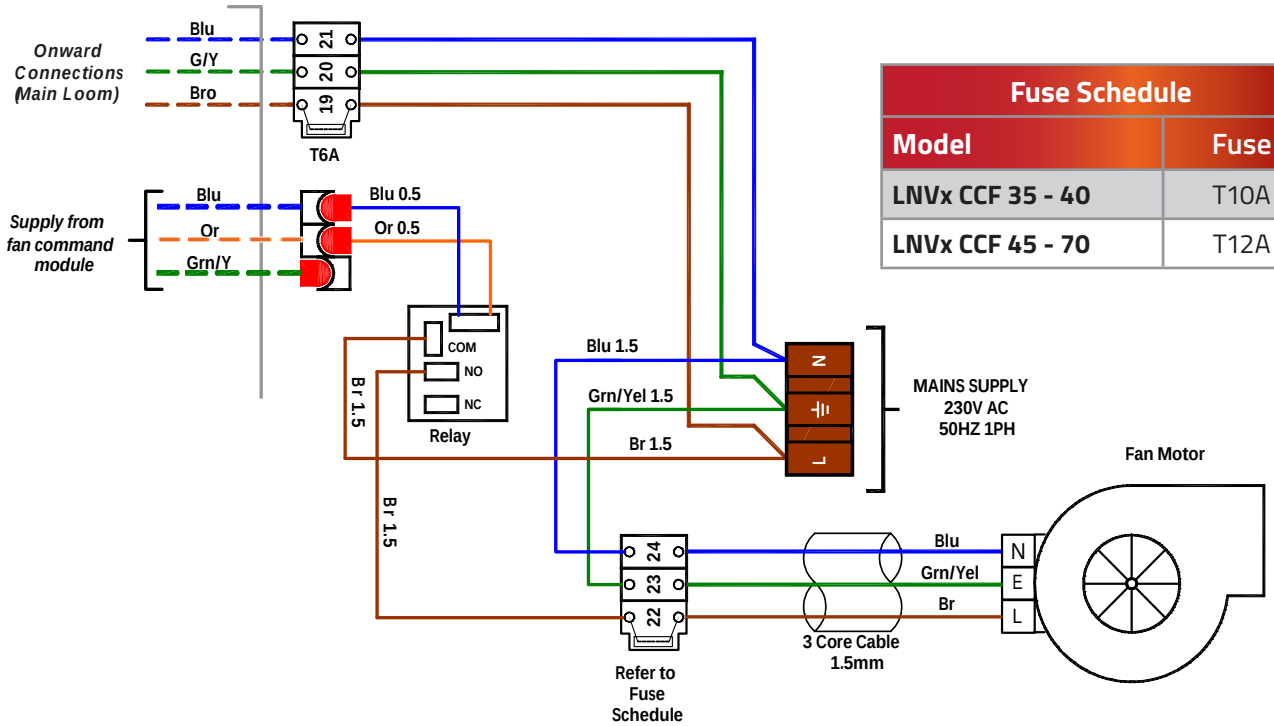
LNVxF 50, 60, & 70 Axial Fan supplementary wiring



LNVxF 90, 120 & 140 Axial Fan supplementary wiring

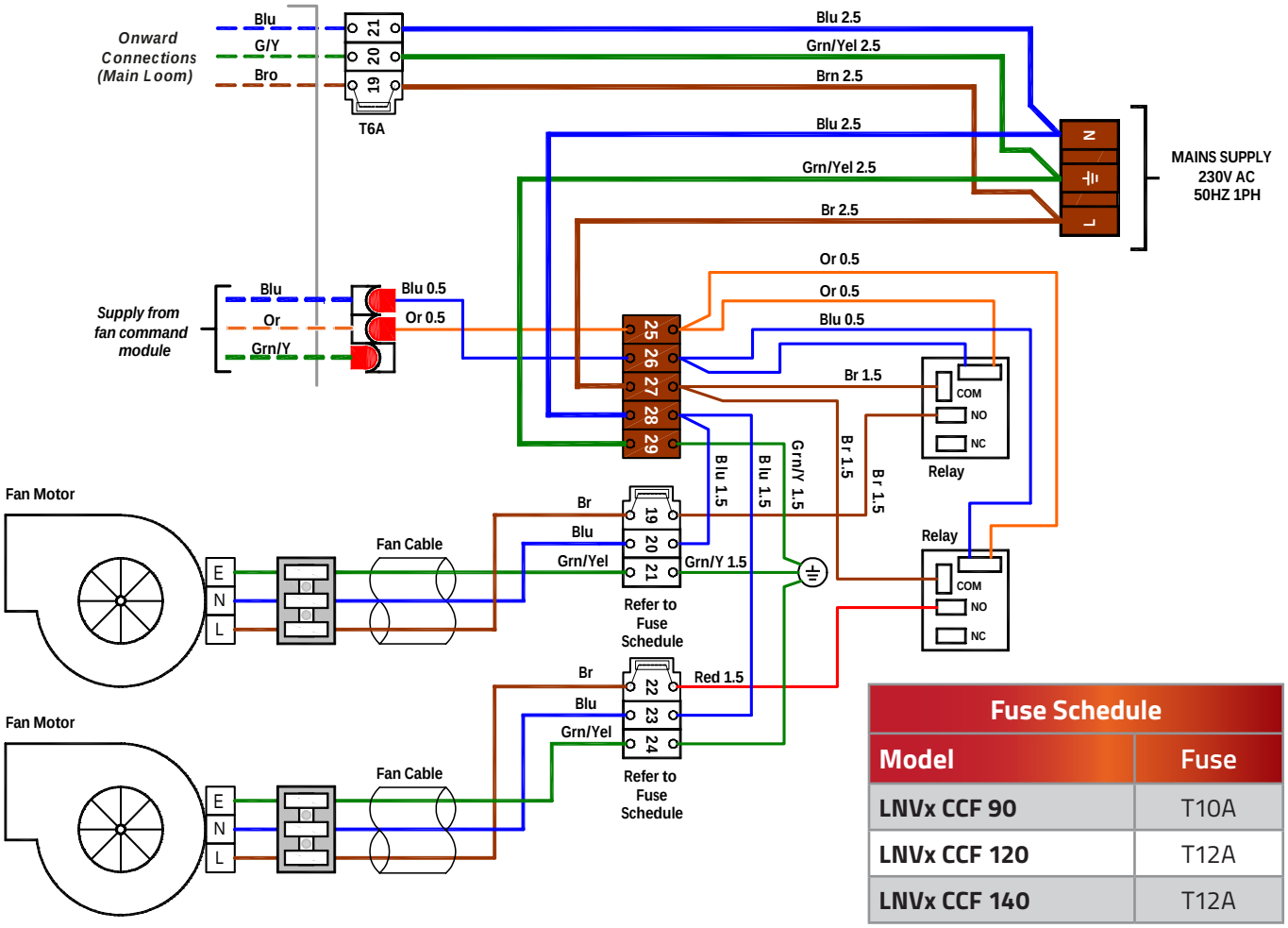


LNVx35 CCF to 70 CCF Single Phase Motor Control Supplementary Wiring



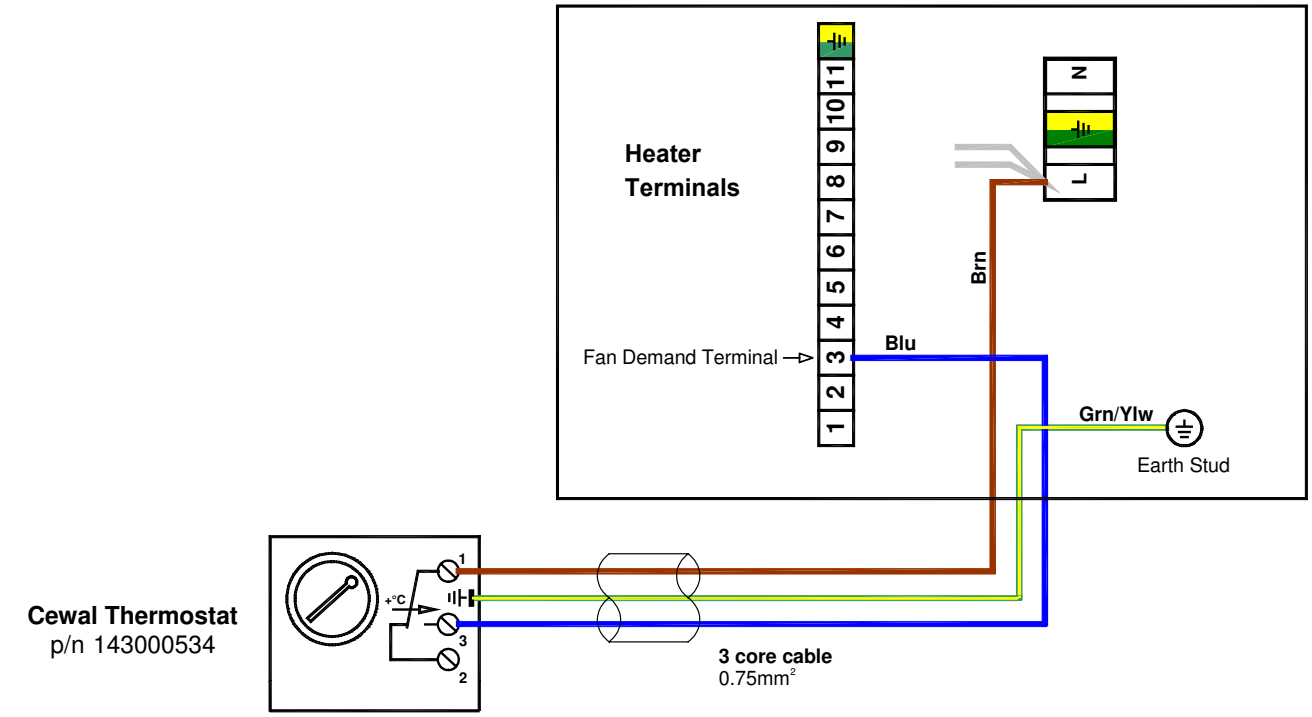
Fuse Schedule	
Model	**Fuse**
LNVx CCF 35 - 40	T10A
LNVx CCF 45 - 70	T12A

LNVx90 CCF to 120 CCF Single Phase Motor Control Supplementary Wiring



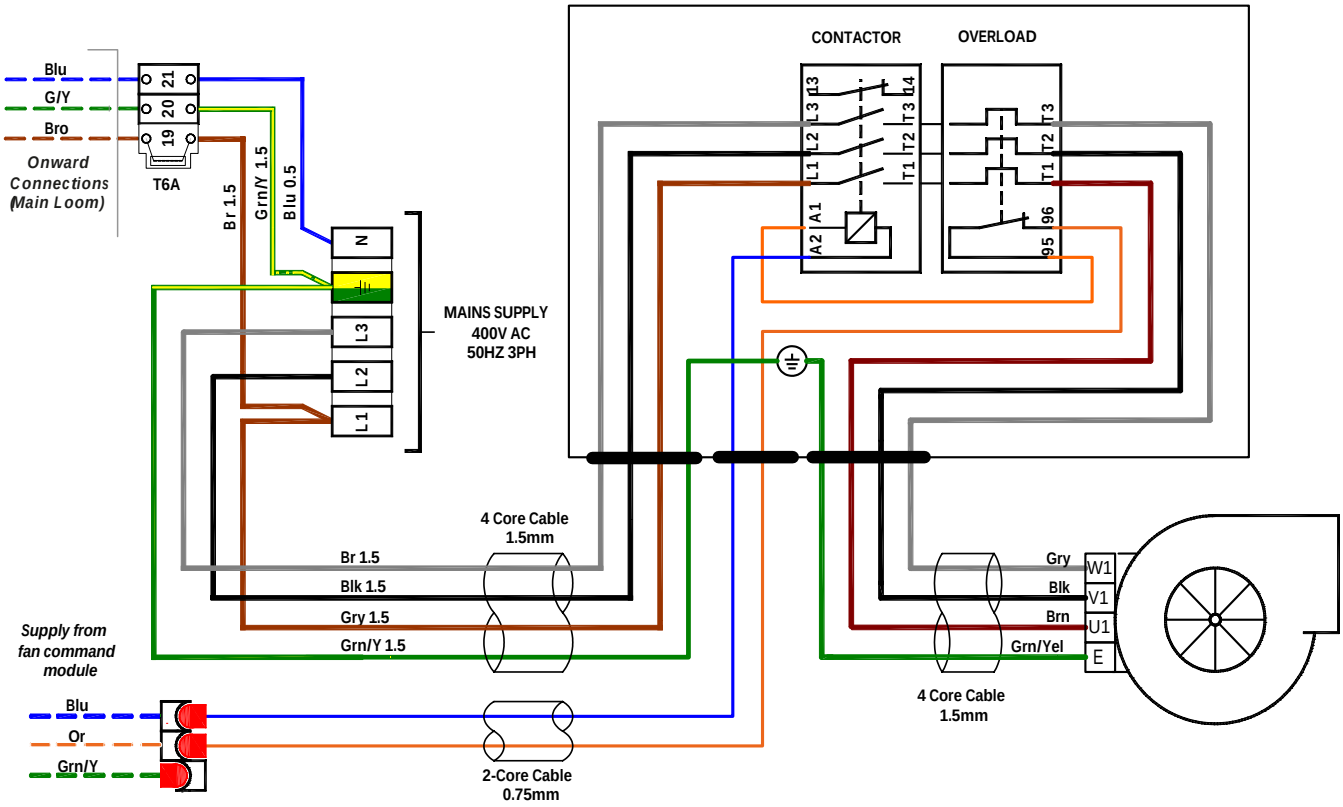
Fuse Schedule	
Model	**Fuse**
LNVx CCF 90	T10A
LNVx CCF 120	T12A
LNVx CCF 140	T12A

LNVx Downflow supplementary wiring



2.5 Wiring Diagrams

LNVx CCF Three Phase Motor Control Supplementary Wiring



2.6 Commissioning and Testing

Gas Safety (Installation & Use) (Amendment) Regulations

It is law that all gas appliances are installed, adjusted and, if necessary, converted by qualified persons* in accordance with the current issue of the above regulations. Failure to install appliances correctly can lead to prosecution. It is in your own interests and that of safety to ensure that the law is complied with.

* Gas Safe Registered Engineer

2.6.1. Electrical Installation

Checks to ensure electrical safety must be carried out by a qualified person.

2.6.2. Gas Installation

For new installations, the whole of the gas installation, including the meter, should be inspected and tested for soundness and purged in accordance with the recommendations of IGE/UP/1 (Edition 2) or IGE/UP/2A as appropriate.

2.6.3. Air Distribution System

The system should be checked to ensure that the installation work has been carried out in accordance with the design requirements.

Particular attention should be given to the correct arrangement of delivery ducts and registers, return air ducts and grills and general adequacy of return air paths.

For LNVx D and LNVx CCF units ensure that the duct work is balanced so that the specified motor running currents are achieved See section 1.2

2.6.4. Checks before Operating the Air Heater

The following preliminary checks should be made before lighting the heater(s)

a) Ensure that the ELECTRICAL supply to the heater is switched OFF.

b) Check that all warm air delivery outlets are open.

c) Check that all external controls are calling for heat.

d) If an MC200 or MC300 is being used ensure that the control is set to winter operation.

2.6.5. Operating the Air Heater

NOTE: On initial lighting of the heater(s), it may take some time to purge the internal pipe work of air.

IMPORTANT: The internal pipe work of the appliance has been tested for soundness before leaving the factory. After establishing the main burners test round the gas inlet connection using a leak detection fluid.

1. Switch on the electrical supply at the isolator.

NOTES: If the red indicator illuminates, remove the adjacent black cap and press the High Limit Reset button. If the amber rocker switch illuminates, depress the switch for 2 seconds to reset the burner lockout.

2. The ignition sequence should now commence. After a delay of approximately 45 seconds the ignition spark will be generated and the main gas valves energized. The burners will then light.

3. If the burners fail to light the control box will complete a further four ignition attempts. If at the end of five attempts the burners have still not lit the control box will go to lockout and the amber rocker switch will be illuminated. To restart the ignition sequence depress the illuminated reset button for about 1-2 seconds.

4. SHUT OFF Set the external controls to OFF or MIN.

2.6.6 Adjustments
2.6.6.1. Burner Gas Pressures

This is set for the required heat input before despatch. High and low pressures should be checked in the following manner:

2.6.6.1.1. High/Low Regulation

1. Set external controls to ensure the main burner is off. Open the side access panel. Connect a pressure gauge to the burner pressure test point on the multifunctional control.

2. Set external controls to turn on the main burner and maintain high fire. Compare the measured burner gas pressure to that stated on the data plate. In addition it is advisable to check the gas rate using the gas meter dial pointer ensuring that no other appliances supplied through the meter are in operation.

3. Repeat 2 above with external controls set to maintain low fire.

4. If it is necessary to adjust either the high fire or low fire pressures proceed as follows after levering off the plastic cover from the High/Low regulator.

Note: High fire setting must be adjusted first after which the low fire setting can be set. Any adjustment of the high fire setting alters the minimum setting.

2.6.6.1.1.1. SIT Sigma 843 Adjustment

Maximum Setting.

With the controls set to high fire, use an adjustable or 10mm spanner to screw the adjustment nut in to increase and out to decrease, until the required pressure is obtained.

Turn the burner On and OFF several times to check the pressure setting and then turn off.

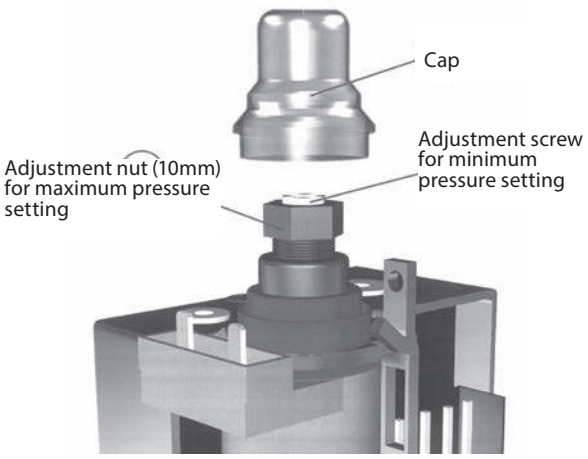
Minimum Setting.

Disconnect electrical connection to the regulator and turn the burner back on and wait until the burner pressure has stabilised.

Keeping the nut stationary, use a 6 x 1 screwdriver to turn the slotted adjustment screw clockwise to increase and counter-clockwise to decrease, until the required pressure is obtained.

Reconnect high/low regulator and check high fire pressure.

Repeat both steps if necessary and then replace cover cap



5. Turn off the main burner, disconnect the pressure gauge and replace the sealing screw.

2.6.6.1.1.2. Honeywell V4336 Adjustment

Maximum Setting

With the controls set to high fire, use an adjustable or 8mm spanner to turn the adjustment screw, clockwise to increase and counter-clockwise to decrease, until the required pressure is obtained

Turn the burner On and OFF several times to check the pressure setting and then turn off.

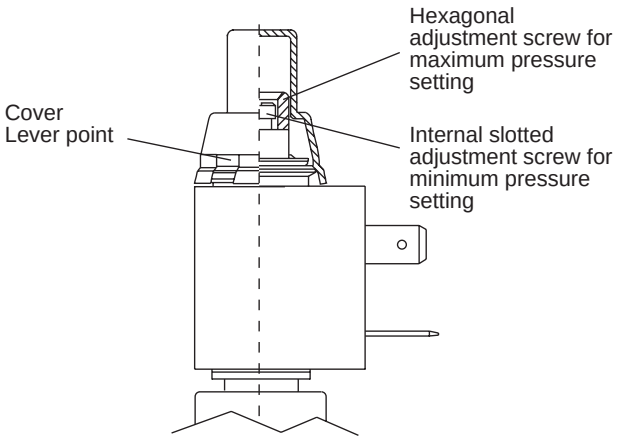
Minimum Setting

Disconnect electrical connection to the regulator and turn the burner back on and wait until the burner pressure has stabilised.

Use a screwdriver to turn the slotted adjustment screw clockwise to increase and counter-clockwise to decrease, until the required pressure is obtained.

Reconnect high/low regulator and check high fire pressure.

Repeat both steps if necessary and then replace cover cap.



5. Turn off the main burner, disconnect the pressure gauge and replace the sealing screw.

2.6.6.1.2. Modulating Regulation

1. Set external controls to ensure that the main burner is off. Open the side access panel. Connect a pressure gauge to the burner pressure test point on the multifunctional control.

2. Set external controls so as to turn on the main burner and maintain high fire. Compare the measured burner gas pressure to that stated on the data plate. In addition it is advisable to check the gas rate using the gas meter dial pointer ensuring that no other appliances supplied through the meter are in operation.

3. Repeat 2 above with external controls set to maintain low fire.

4. If it is necessary to adjust either the high fire or low fire pressures proceed as follows after removing the plastic cover from the Modulating regulator.

Note: Minimum fire setting must be adjusted first after which the high fire setting can be set. Any adjustment of the minimum fire setting alters the maximum setting.

Minimum Setting.

Disconnect electrical connection of modulating regulator and turn burners back on and wait until the burner pressure has stabilised.

Turn 9mm adjustment nut for low fire pressure clockwise to increase and counter-clockwise to decrease until the required pressure is obtained.

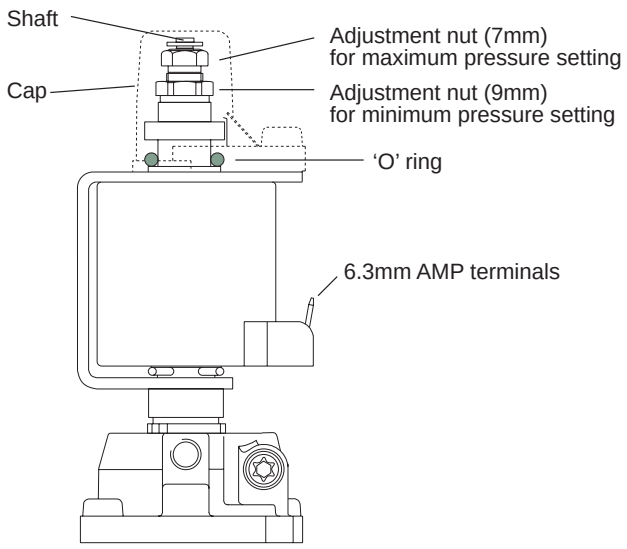
Reconnect modulating regulator and check high fire pressure, readjust if necessary.

Maximum Setting.

Disconnect electrical connection of modulating regulator and turn burners back on and wait until the burner pressure has stabilised.

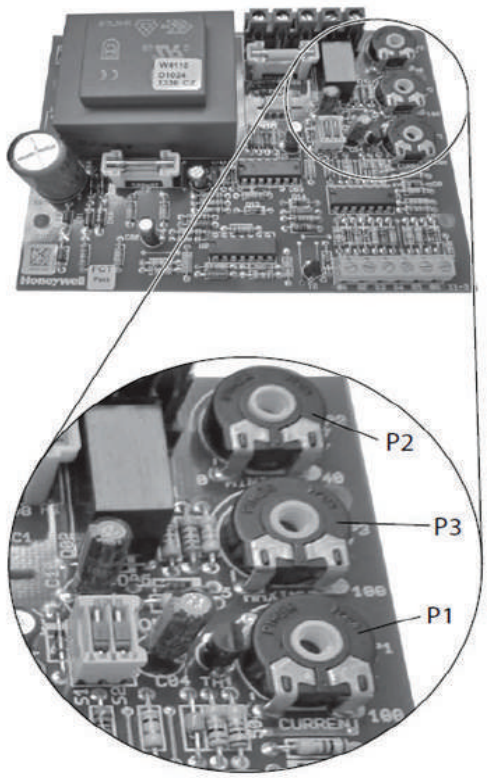
Push shaft gently downwards to the maximum adjustment screw and hold there. Turn 7mm adjustment nut for high fire pressure, clockwise to increase and counter-clockwise to decrease, until the required pressure is obtained. Release shaft.

Repeat both settings if necessary and then replace cover cap.



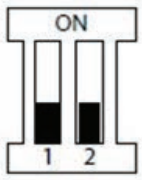
5. Turn off the main burner, disconnect the pressure gauge and replace the sealing screw.

2.6.6.1.3. GM44 Modulating Interface



The MIB interfaces between a 0-10VDC control signal and the modulating regulator. The following are applicable to this application.

1. The setting of the slide switches 1 & 2 should both be to OFF.



2. Potentiometer P1 (Default setting 100%)

The control current of the V7335A is controlled by P1, varying between 50% and 100% of the input signal.

E.g. -When P1 is set at 100% (fully clockwise) maximum power (165mA @ 22VDC) is provided to the modulation coil with a 10VDC input control signal.

-When P1 is set at 50% (fully anticlockwise) maximum power (165mA @ 22VDC) is provided to the modulation coil with a 5VDC input control signal.

3. Potentiometer P2

Controls the minimum drop-out voltage between 0% and 40% E.g.

- When P2 is set at 0% the drop-out voltage with an input control signal of 0-10V-DC is 0.3V-DC.

- When P2 is set at 40% the drop-out voltage with an input control signal of 0-10V-DC is 4.0V-DC.

4. Potentiometer P3 (Default setting 100%)

Controls the maximum hold-in voltage. Its proportional value is added to the P2 setting E.g.

- When P2 is set at 0% and P3 is set at 5%, the hold-in voltage of the burner relay is adjustable between 5% and 100% of the input control signal. If the input control signal is set at 0-10V-DC the hold-in voltage of the relay is 0.5V-DC.

- When P2 is set at 40% and P3 is set at 5%, the hold-in voltage of the burner relay is adjustable between 45% and 100% of the input control signal. If the input control signal is set at 0-10V-DC the hold-in voltage of the relay is 4.5V-DC.

2.6.6.1.4. Optional Full Modulating Control Board

For Modulation a modulating control board is fitted (which also includes the fan command outputs). The board interfaces between a 0-10VDC control signal and the modulating regulator.

Basic operation method

1. With the 0 to 10 signal at 0, the gas valve drive signal will be de-energised.

2. When the input control signal goes to >2V, the gas valve drive output will be at its maximum output value for a preset 2 minutes.

3. An input signal from the burner controller - when received by the board continually for more than 30 seconds - will switch an output to the main heater fan.

4. After the preset 2 minutes of maximum output, the 0 to 10V input signal will take control of the gas valve drive.

5. When the 0 to 10V signal drops below 1V the signal will drop to zero and the gas valve drive signal will be de-energised.

6. The fan output will continue for a further 2.5 minutes.

2.6.6.2. Final Adjustments

1. In addition it is advisable to check the gas rate using the gas meter dial pointer. Ensure that no other appliances supplied through the meter are in operation.

2. If required, after checking or setting the burner pressures, the CO2 content in the flue gases as well as the flue gas temperatures can be checked by sampling in the first section of flue fitted to the flue outlet of the unit.

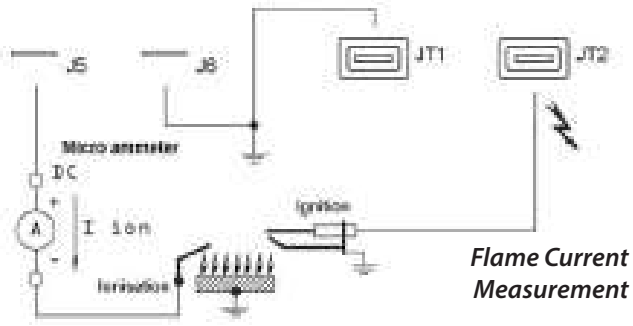
2.6 Commissioning and Testing

3. Turn on the main burner as before and test for gas soundness around pressure test joint using a leak detection fluid e.g. soap solution. Replace access panel.

2.6.6.3. Flame Current

1. To measure the flame current connect a multimeter capable of measuring micro amps as shown in the following diagram.

2. Minimum current reading is 0.5µA and normal value should be 1.5µA or higher.



Flame Current Measurement

2.6.6.4. CCF Adjustments

Using a clamp meter around the fan power cable and with all side panels closed, check the running current of the centrifugal fan once the heater is running and compared with the table below.

Model	Pha	Motor kW	Typical Running Current	Max Running Current
LNVx15	1	0.55	2.0A	5.0A
LNVx20	1	1.1	3.1A	5.5A
LNVx25	1	1.1	4.2A	5.5A
LNVx30	1	1.6	4.3A	8.0A
LNVx35	1	1.6	4.7A	8.0A
LNVx40	1	1.6	5.8A	8.0A
LNVx45	1	2.0	7.6A	9.8A
LNVx50	1	2.0	7.6A	9.8A
LNVx60	1	2.2	10.0A	10.0A
LNVx70	1	2.2	11.0A	11.0A
LNVx90	1	2 x 1.6	6.4A*	8.0A*
LNVx120	1	2 x 2.2	8.5A*	10.0A*
LNVx140	1	2 x 2.2	10.0A*	10.0A*

** currents shown for each fan*

WARNING: Exceeding the MAX running current will cause the fan's thermal overload to trip!

Adjust the balancing dampers within the airflow ductwork system to achieve a current suitable for the model in question.

2.6.6.5. Limit Thermostat

Limit Thermostat settings:-

LNVx15-30 = 90°C
LNVx35 = 110-120°C
LNVx40-140 = 90°C

Note: LNVx35 & 90 - 140 units have two limit thermostats whereas all other units have only one. The second stat is at the opposing side of the heater to the burner/controls end. The limit thermostats are wired in series (either thermostat will shut down the burner).

2.6.7. Air Heater Controls

1. Close the gas service tap and ensure that the gas valve is heard to close within 1 second and that the lockout light is illuminated. Note that the heater may attempt five re-ignitions before going to lockout. Open the gas service tap and reset the unit from lockout.

2. Check that the room thermostat and all automatic controls are operating satisfactorily.

2.6.8. Handing over the Air Heater

Hand these instructions to the user or purchaser for retention and instruct in the efficient and safe operation of the air heater and associated controls. Adjust the automatic controls to those values required by the User.

Finally, advise the user or purchaser that, for continued efficient and safe operation of the air heater, it is important that servicing is carried out annually.

In the event that the premises are not yet occupied turn off the gas and electricity supplies and leave instructional literature adjacent to gas meter.

Gas Safety (Installation & Use) (Amendment) Regulations

It is law that all gas appliances are installed, adjusted and, if necessary, converted by qualified persons* in accordance with the current issue of the above regulations. Failure to install appliances correctly can lead to prosecution. It is in your own interests and that of safety to ensure that the law is complied with.

* Gas Safe Registered Engineer.

WARNING: Always switch off and disconnect electricity supply and close the gas service valve before carrying out any servicing work or replacement of failed components.

NOTE: If a suspended air heater is to be serviced do not lean ladders against the heater. Ensure that an access tower or equivalent is used.

NOTE: The access door to the controls section may be removed to improve access.

Open the door to 90°, remove the earth cable at the bottom, and then lift the door vertically upwards to disengage the hinge plates. Refit in reverse order. Ensure that the earth cable is refitted.

2.7.1. General

Full maintenance should be undertaken not less than once per year by a qualified person. No 'specialised 'tools will be required to carry out this service. A fault finding guide is given in section 3.1 to aid servicing.

After any servicing work has been complete, or any component replaced, the air heater(s) must be fully commissioned and tested for soundness as described in Section 2.6.

To commence servicing, firstly open the side access door by rotating the quarter turn screw(s).

2.7.2. Main Burner Assembly Removal

1. Ensure that the gas service valve is turned OFF and then unscrew the union nut situated immediately downstream of it.

2. Disconnect the spark and rectification leads from the control box and remove the electrical plug connections from the top of the gas control valve assembly.

3. Remove the burner heat shield, 3 screws.

4. Release the inlet connection flange from the gas valve by removing the four screws.

5. If required remove the manifold by removing the four screws securing it to the burner assembly.

6. Remove the two screws that secure the top of the burner assembly to the bulkhead and lift out burner assembly.

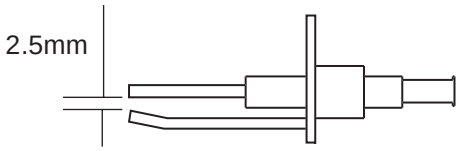
7. Using a stiff brush, not a wire brush, brush the burners to dislodge accumulated deposits. Inspect the burners both internally and externally to ensure that they are clean. Examine the injectors and if damaged or deteriorated, replace with new ones of the correct size and marking. If deemed necessary, clean the injectors. Do not broach out with wire.

8. Reassemble the injectors, manifold and burners in reverse order to that above.

2.7.3. Ignition and Rectification Electrodes

Note: The ignition electrode is located at the bottom of the burner assembly, the rectification electrode is located at the top of the burner assembly.

Inspect the electrodes, making sure that they are in a sound and clean condition. In particular check that the ignition electrode is clean and undamaged. Check that the spark gap is 2.5mm and that the rectification probe is 10 - 12mm forward of the burner.



Ignition Electrode Spark Gap

2.7.4. Exhaust Fan

1. Remove the four screws securing the flue outlet socket.

2. Disconnect the fan electrical connections from the main terminal strip

3. Remove the screws securing the fan mounting box to the exhaust header plate.

2.7 Servicing

4. Clean impeller by brushing with a stiff brush.

5. Re-assemble using a new sealing gasket to the fan mounting box. Use silicon sealant around the joints.

2.7.5 Heat Exchanger

Whilst the main burner assembly is removed from the unit, check that the primary sections that the burners fire into are clean

2.7.6 Main Fan Assembly
2.7.6.1. LNVx F & CCF Models

1. Inspect the fan blades for any damage or excessive buildup of deposits that could give rise to an imbalance. Remove the assembly for cleaning as follows.

2. Slacken the cable gland on the heater casing through which the fan electrical cable passes.

3. Disconnect the fan leads from the electrical terminals.

4. Withdraw cable through entry grommet.

5. Remove the fan and motor assembly complete by removing the hexagon headed screws that secure the fan to the rear panel.

6. Reassemble in reverse order.

2.7.6.2. Centrifugal Fan/Silencer Section

1. Remove section side panel(s) and inspect the fan blades for any damage or excessive buildup of deposits that could give rise to an imbalance. Remove the assembly for cleaning as follows.

2. Slacken the cable gland on the casing through which the fan electrical cable passes.

3. Disconnect the fan leads from the electrical terminals in the contactor enclosure.

4. Withdraw cable through entry grommet.

5. Remove the complete fan assembly by removing the fixings securing the fan to the base rails.

6. Reassemble in reverse order.

2.7.7. Replacement of Faulty Components

Only parts supplied via or authorised by Powrmatic should be used. A short list of parts and part numbers are detailed in section 3.2 of this manual. If in doubt, please contact Powrmatic.

2.7.7.1 Multifunctional Control

1. Ensure that the gas service valve is turned OFF. If a flexible gas connection has been used go to step 2 otherwise unscrew the union nut situated immediately downstream of the gas service valve.

2. Remove the electrical plug connections from the top of the multifunctional control.

3. Release the flanged connections at the inlet and outlet of the multifunctional control and remove the multifunctional control.

4. Reconnect the new valve in the reverse order to that above ensuring that the valve is correctly orientated. Renew the sealing 'O' rings if necessary.

2.7.6.2. Burners

1. Remove the burner assembly as described in Section 2.7.2.

2. Remove the end plates of the burner assembly and the central burner support plate.

3. Exchange burners as required and reassemble components in reverse order.

4. Re-commission the appliance as described in Section 2.6.

2.7.6.3. Electrode Assemblies

1. Disconnect the electrode leads from the control box as appropriate.

2. Remove the screw securing the electrode assembly to the burner assembly side plate and withdraw the assembly.

3. Fit replacement and reassemble in reverse order. Check that the spark gap is 2.5mm (See section 2.7.3) and the rectification electrode is 10 - 12mm forward of the burner.

2.7.7.4. Limit Thermostat

NB. Ensure that the thermostats are set correctly before fitment.

Limit Thermostat settings:-

LNVx15-30 = 90°C
LNVx35 = 110-120°C
LNVx40-140 = 90°C

1. Remove the screws securing the thermostat phial mounting plate to the inner bulkhead*, withdraw assembly and unclip the phial.
2. Remove the electrical connections from the limit thermostat.
3. Remove the securing nut and remove thermostat from the front panel.
4. Fit replacement thermostat in reverse order.

Note*: LNVx35 & 90 - 140 units have a second limit stat at the opposing end of the heater to the burner/controls. Remove the two small cover plates and replace as above.

2.7.7.5. Air Pressure Switch

1. Remove the two screws securing the cover and remove.
2. Disconnect electrical connections.
3. Pull off the sensing tube from the air pressure switch.
4. Remove the screws fixing the air pressure switch and remove switch.
5. Fit replacement in reverse order refitting the sensing tube to the negative (- or L) tapping on the pressure switch.
6. Adjust pressure switch set point to that shown in the table below.

Model	Setting (Pa)
LNVx15	180
LNVx20	160
LNVx25	140
LNVx30	160
LNVx35	180
LNVx40	160
LNVx45	120
LNVx50	180
LNVx60	200
LNVx70	200
LNVx90	300
LNVx120	350
LNVx140	330

2.7.7.6. Exhaust Fan

1. Remove the four screws securing the flue outlet socket.
2. Disconnect the fan electrical connections from the main terminal strip
3. Remove the screws securing the fan mounting box to the exhaust header plate.
4. Remove fan assembly.
5. If needed, transfer the fan mounting box to the replacement fan.
6. Fit replacement exhaust fan, using new gaskets and silicon sealant as necessary, and reassemble in reverse order.

2.7.7.7. Control Box

1. Unplug all the electrical connections.
2. Remove the two screws that secure the control box.
3. Fit replacement in reverse order.

2.7.7.8. Fan Command Module/GM44 Modulating Interface/ Optional Full Modulating Control Board

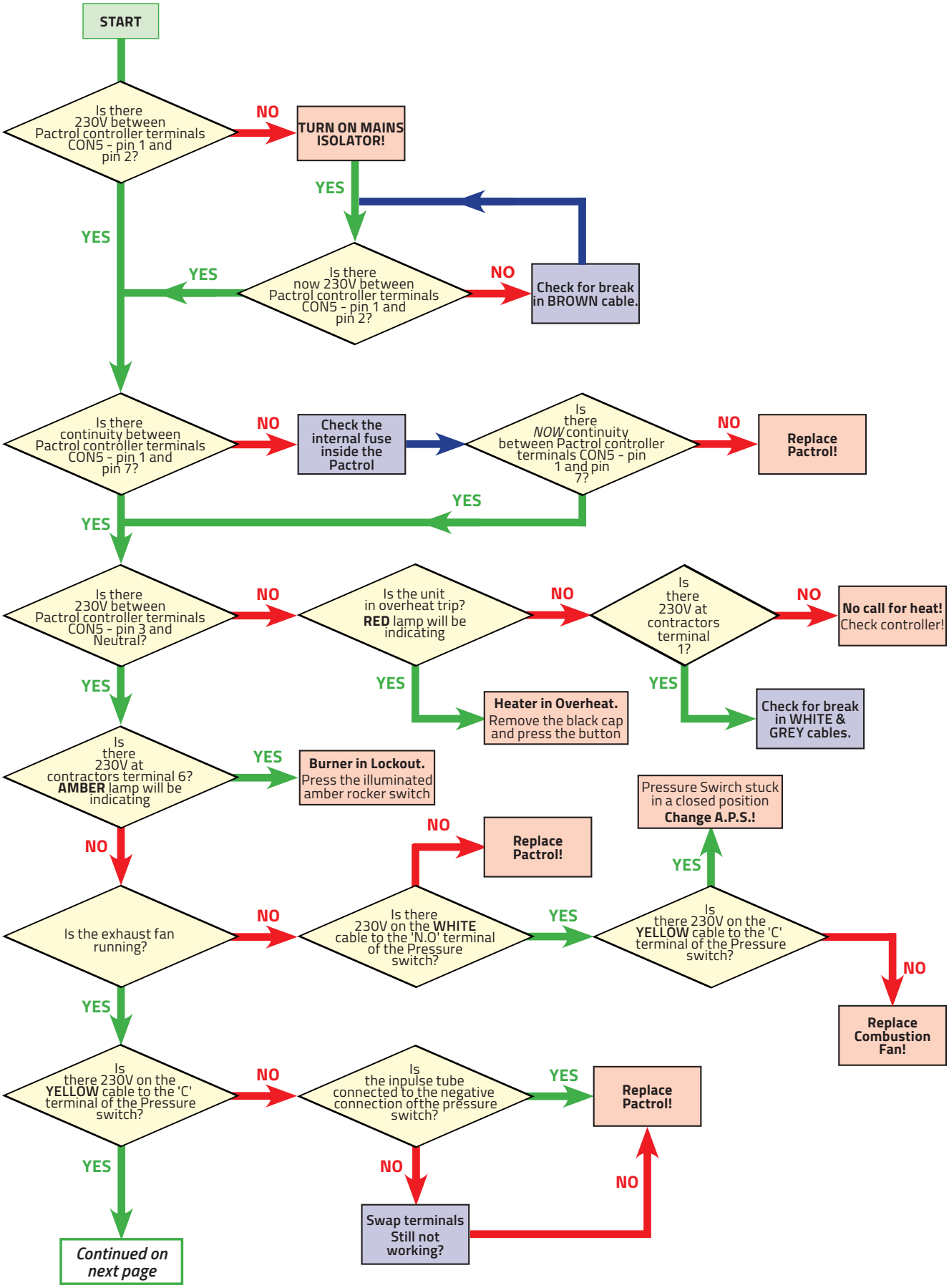
1. Unplug all the electrical connections by squeezing each side to release.
2. Using a small flat screwdriver push on the locking tab of each PCB mount and gently ease the board upwards to release.
3. Fit replacement in reverse order.

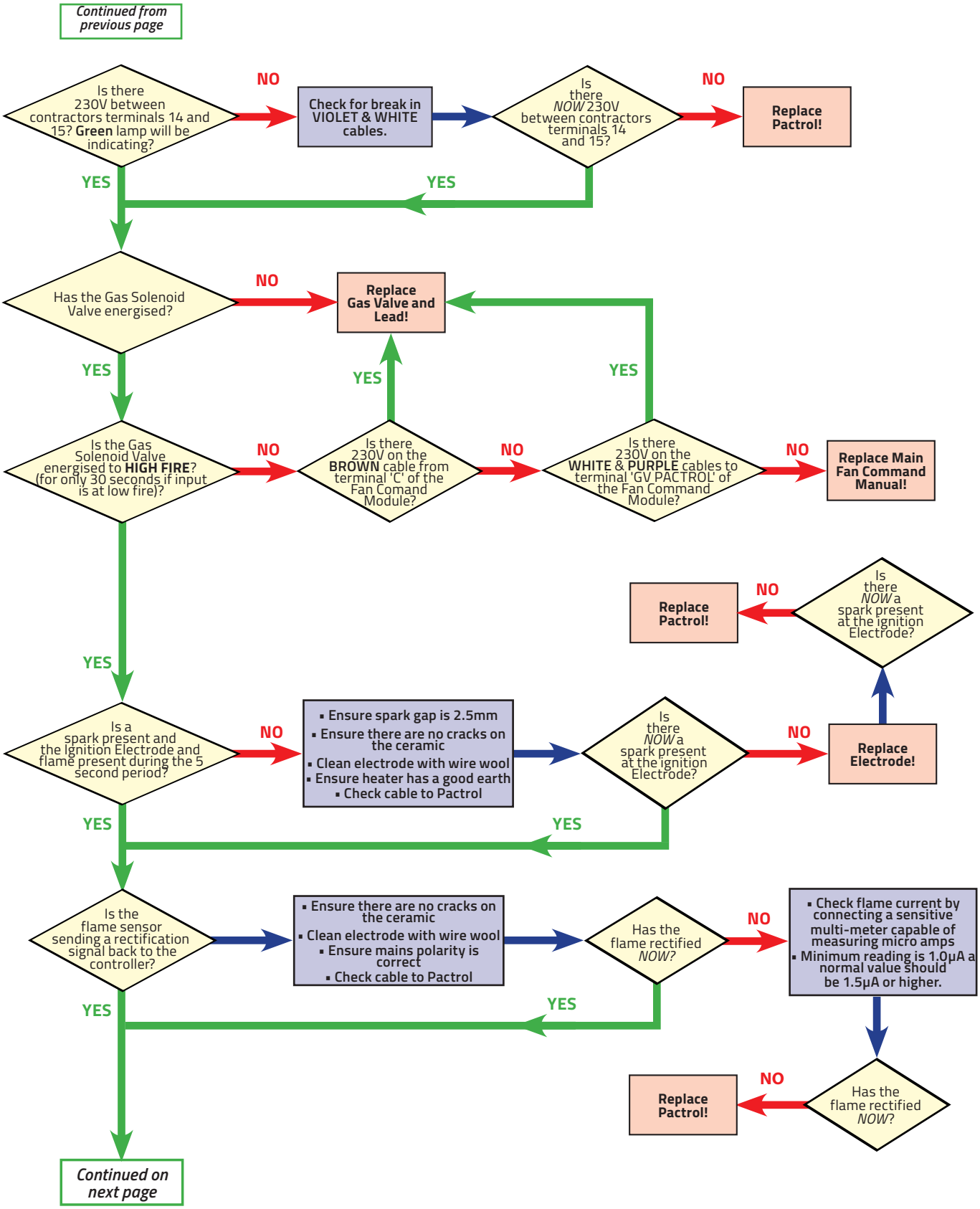
2.7.7.9. Centrifugal Fan/Motor

1. Disconnect the electrical connections to the centrifugal fan section.
2. Remove the side panels of the section for access to the fan and motor.
3. Fit replacements as appropriate and reassemble in reverse order.

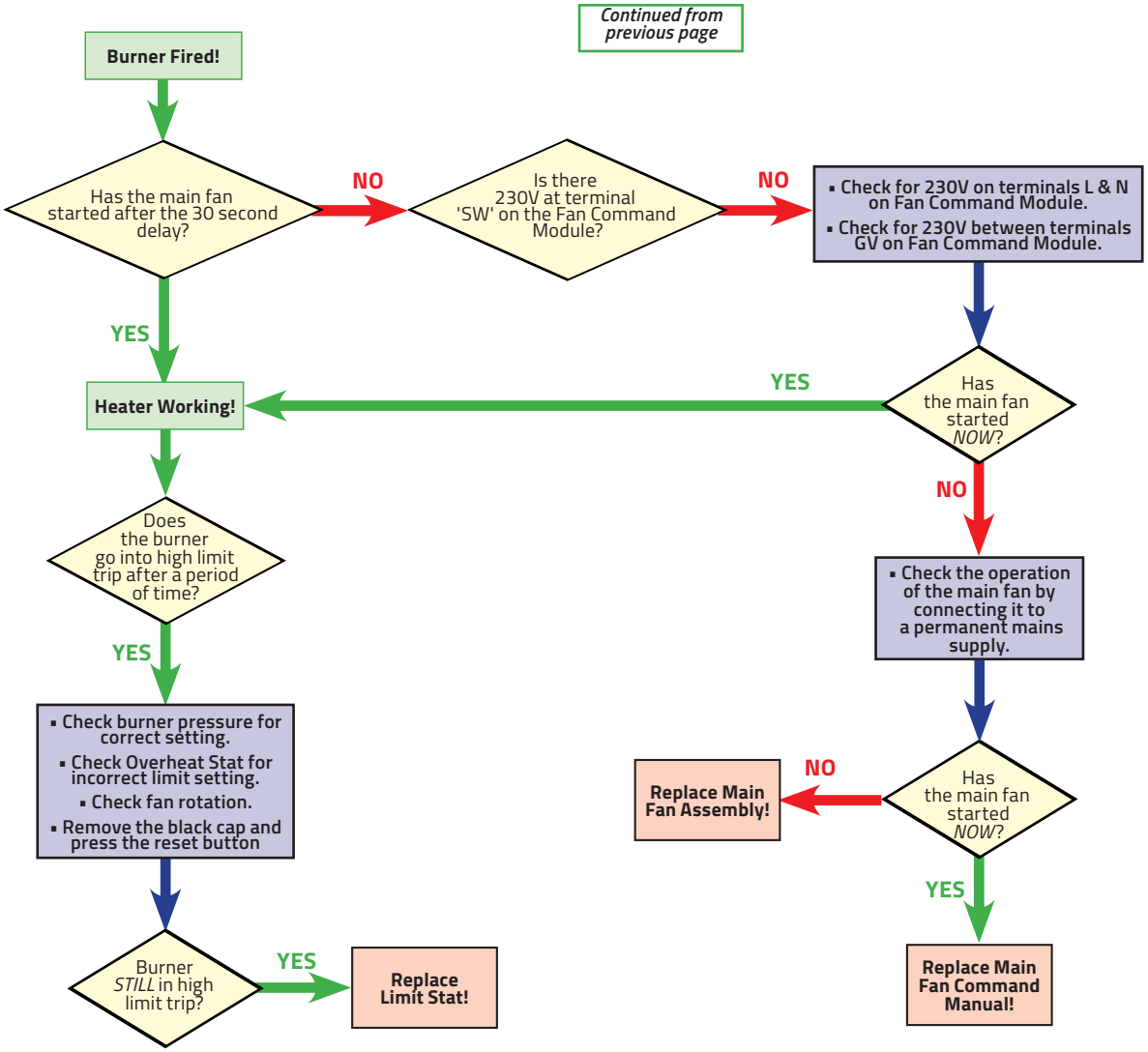
Note: If a 3ph motor is being replaced ensure that the direction of rotation is correct. If it is not interchange any two of the three phases connected to the motor.

3.1 Fault Finding




Continued from previous page
Is there 230V between contractors terminals 14 and 15? Green lamp will be indicating?
NO
Check for break in VIOLET & WHITE cables.
Is there NOW 230V between contractors terminals 14 and 15?
NO
Replace Pactrol!
YES
YES
Has the Gas Solenoid Valve energised?
NO
Replace Gas Valve and Lead!
YES
YES
YES
Is the Gas Solenoid Valve energised to HIGH FIRE? (for only 30 seconds if input is at low fire)?
NO
Is there 230V on the BROWN cable from terminal 'C' of the Fan Comand Module?
NO
Is there 230V on the WHITE & PURPLE cables to terminal 'GV PACTROL' of the Fan Command Module?
NO
Replace Main Fan Command Manual!
YES
Replace Pactrol!
NO
Is there NOW a spark present at the ignition Electrode?
Is a spark present and the Ignition Electrode and flame present during the 5 second period?
NO
▪ Ensure spark gap is 2.5mm
▪ Ensure there are no cracks on the ceramic
▪ Clean electrode with wire wool
▪ Ensure heater has a good earth
▪ Check cable to Pactrol
Is there NOW a spark present at the ignition Electrode?
NO
Replace Electrode!
YES
YES
Is the flame sensor sending a rectification signal back to the controller?
▪ Ensure there are no cracks on the ceramic
▪ Clean electrode with wire wool
▪ Ensure mains polarity is correct
▪ Check cable to Pactrol
Has the flame rectified NOW?
NO
▪ Check flame current by connecting a sensitive multi-meter capable of measuring micro amps
▪ Minimum reading is 1.0µA a normal value should be 1.5µA or higher.
YES
Has the flame rectified NOW?
NO
Replace Pactrol!
YES
Continued on next page

3.1 Fault Finding



3.1.1 Optional Modulation Driver LED Indication

The unit will have a single LED indicator and will provide the following information :-

Steady on LED

Unit in standby mode (all outputs off)

1 LED Blink

Summer fan "ON" mode active.

2 LED Blinks

DC control signal received >2V, Heating mode gas valve drive at maximum.

3 LED Blinks

Fan output on, (heating mode) Heating mode gas valve drive follows DC input.

4 LED Blinks

DC control signal <2V. Heating mode now off but fan in overrun mode (2.5 mins max)

Slow Blink (timeout)

Auto Time Out has occurred. (i.e. DC control signal received >2V but no trigger from sequence controller within 5 mins.

3.2 List of Parts

Item	Description	Usage	Part No.
	Gas Valve SIGMA 843	15-50	145035208HL-SIT/KIT/SP
	Gas Valve VK4105P	15-40	145035208HL/KIT
	Gas Valve VR4605PB	45-90	145035204HL/KIT
	Gas Valve V425PB	120/140	141378715HL/KIT
	Ignition Electrode	15-70 90-140	142423010 142423004
	Rectification (Flame Sensor) Probe	All	142423003
	Burner	15-70 90-140	142400240 142400241
	Limit Stats	All except LNVx35F & V	142403609 142403611
	Control Box (Sequence Controller)	All High/Low All Modulation	145030846 145030847
	High/Low Governor Head Honeywell	15/HL-140/HL	142466402
	Modureg Governor Head Honeywell	15/MOD-140/MOD	142466403
	Fan Command Module MkIII	All (except with 142400303M)	142403603

3.2 List of Parts

	Modulation Driver (GM44)	15-140 -/MOD	142400303
	Option Fan & Modulation Burner Controller	15/MOD-140/MOD	142400303M
	Lockout Reset Switch	All	143070276
	Pressure Switch HUBA 604	All	146522177
	Exhaust Fan Exhaust Fan c/w Mounting Brackets	15-30, 40-45 15-30, 40-45	140210496 LNVX1545EXH/SP
	Exhaust Fan Exhaust Fan c/w Mounting Brackets	35, 50-70 35 50 60 & 70	140201505 LNVX35EXH/SP LNVX50EXH/SP LNVX6070EXH/SP
	Exhaust Fan Exhaust Fan c/w Mounting Brackets	90-140 90-140	140201506 LNVX90140EXH/SP
	Main Air Fan - LNVx F	15 20 25 30 35 (closest to burner) 35 (opposing burner) 40 45/50/90 60/70/120/140	140232002/E/15 140232003/E/15 140232004/E/15 PM-6-500-B-15 PM-4-350-B-15 PM-6-350-B-15 140232005/E/15 140232006/E/15 140232007/E/15
	Main Centrifugal Blower - LNVx CCF	15 20/25 30/35/40 45/50 60/70 90 120/140	1402CFAN011-T 1402CFAN150/T/15 1402CFAN210/T/15 1402CFAN560/T/15 1402CFAN580/T/15 1402CFAN210/T/15 1402CFAN580/T/15

Appendices

Information required for ecodesign (ErP) Directive 2009/125

Model			15	20	25	30	35
Rated Heat Capacity		kW	15.5	20.5	26.0	30.0	36.5
Low Heat Input	Nett CV	kW	9.5	14.1	18.2	22.4	26.1
Minimum Heat Capacity		kW	8.6	12.7	16.3	19.8	23.8
Useful Efficiency	High Fire	%	94%	93%	92%	92.2%	93%
	Low Fire	%	90%	90%	90%	90%	91%
Electrical Power Consumption*	High Fire	kW	0.07	0.07	0.07	0.07	0.07
	Low Fire	kW	0.07	0.07	0.07	0.07	0.07
	Standby	kW	<0.01	<0.01	<0.01	<0.01	<0.01
	Ignition	kW	0.00	0.00	0.00	0.00	0.00
NOx Seasonal (Gross)		mg/kWh	<96.0	<96.0	<96.0	<96.0	<96.0
Envelope Loss Factor		%	N/A	N/A	N/A	N/A	N/A
Emission Efficiency		% ηs, flow	94%	93%	94%	94%	94%
Seasonal Space Heating Energy Efficiency		% ηs,h	72.4%	72.1%	72.1%	72.3%	74%

Model cont.			40	45	50	60
Rated Heat Capacity		kW	40.5	47.0	54.4	66.0
Low Heat Input	Nett CV	kW	28.2	32.5	37.4	45.1
Minimum Heat Capacity		kW	25.5	29.8	33.9	40.8
Useful Efficiency	High Fire	%	93%	94%	93%	92%
	Low Fire	%	91%	92%	91%	90%
Electrical Power Consumption*	High Fire	kW	0.07	0.06	0.06	0.06
	Low Fire	kW	0.07	0.06	0.06	0.06
	Standby	kW	<0.01	<0.00	<0.01	<0.01
	Ignition	kW	0.00	0.00	0.00	0.00
NOx Seasonal (Gross)		mg/kWh	<96.0	<96.0	<96.0	<96.0
Envelope Loss Factor		%	N/A	N/A	N/A	N/A
Emission Efficiency		% ηs, flow	94%	94%	94%	94%
Seasonal Space Heating Energy Efficiency		% ηs,h	72.8%	74.4%	72.8%	74.4%

Model cont.			70	90	120	140
Rated Heat Capacity		kW	76.5	97.5	126.8	146.1
Low Heat Input	Nett CV	kW	52.9	71.7	90.8	101.2
Minimum Heat Capacity		kW	47.8	65.3	83.5	93.3
Useful Efficiency	High Fire	%	92%	92%	93%	94%
	Low Fire	%	90%	81%	92%	92%
Electrical Power Consumption*	High Fire	kW	0.06	0.06	0.06	0.06
	Low Fire	kW	0.06	0.06	0.06	0.06
	Standby	kW	<0.01	<0.01	<0.01	<0.01
	Ignition	kW	0.00	0.00	0.00	0.00
NOx Seasonal (Gross)		mg/kWh	<96.0	<96.0	<96.0	<96.0
Envelope Loss Factor		%	N/A	N/A	N/A	N/A
Emission Efficiency		% hs, flow	93%	93%	93%	93%
Seasonal Space Heating Energy Efficiency		% hs,h	72.1%	72.1%	73.7%	73.7%

TESTED

STAGE 1 **Full mechanical, construction, assembly and electrical sequence check** ☐

STAGE 2 **Full functional test in accordance with Quality System Procedures** ☐

Heater Model _____

Heater Serial No. _____

Type of Gas _____

Final

Getting In Touch

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More information is available from our website by scanning the following QR code.

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