

AIR ROTATION SYSTEM INSTALLATION AND OPERATING MANUAL



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WARNINGS

- 1 This appliance must only be installed by a competent person in accordance with the requirements of the Codes of Practice or the rules in force.
- 2 All external wiring **MUST** comply with the current IEE wiring regulations.
- 3 Warning this appliance must be earthed.

1. Introduction.

Before installation, check that the appliance as described on the packaging label is in accordance with the correct type and model as specified on the data plate and complies with the site requirements.

The heater is delivered wrapped in heavy duty polythene and should be checked to ensure that it has been delivered undamaged.

Please read this document before commencing installation. The onus rests with the installer to ensure that all relevant manuals are read and understood, especially with regard to any safety instructions stipulated by the manufacturer.

Check that the local electricity supply, type of gas and pressure of the appliance are compatible.

The installation must comply with the requirements and recommendations of British Standard BS 6230 1991. "Installation of Gas Fired Forced Convection Air Heaters for Commercial and Industrial Space Heating".

These instructions are only valid for the country of use indicated on the appliance, for example GB - IE. If these symbols are not shown it is necessary to obtain appropriate technical instructions, which will provide information concerning the necessary modification of the appliance for use in the country concerned. Such instructions may be obtained from your supplier upon request.

Health and Safety

Nordair Niche heaters must be installed in accordance with the relevant provisions of the Gas Safety (Installations and Use) Regulations 1998. Due account should also be taken of any obligations arising from the Health and Safety at Works Act 1974 or relevant codes of practice. In addition the installation must be carried out in accordance with the current IEE wiring regulations (BS 7671:2001), BS 6896:2005 (Industrial & Commercial) and any other relevant British Standards and Codes of Practice by a qualified installer. Isolate all electrical supplies to the heater & controller before proceeding.

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

Warranties

Unauthorised modification of this appliance or departure from use in the manner for which it was intended by the manufacturer or installed in a manner contrary to these instructions, may constitute a hazard and jeopardise all warranties. Deviations should only be carried out after formal consent has been obtained from the manufacturer.

Caution

Ensure that the environment in which the air heater is to be installed will not create a hazard, i.e. where excessive (volatile) dust, flammable or corrosive substances and/or vapours and combustible materials may be present.

Suitable protection should be given to prevent damage to the appliance, for example from fork lift trucks.

When installing outdoor heaters care must be taken to ensure that unauthorised access to the building cannot be gained via the appliance or its ductwork system

This appliance has been tested and set according to the data plate before leaving the factory.

After installation the appliance must be fully commissioned and the settings re-checked.

This appliance incorporates CE approved Indirect Gas Fired Heat Exchange modules.

Quality Products

This Nordair Niche range of IDF indirect fired Warm Air package units heaters is manufactured in the EC and supplied in accordance with BS EN 9002: Quality Assurance System.

Certificates of Conformity are available from the Quality Control department at Nordair Niche.

Product Information

Nordair Niche IDF heaters are available with heat outputs from 100 to 600kW.

All IDF heaters are fitted with a pre-tested and set induced draught burner. A sequential control box is fitted to each burner to provide safety.

Note No asbestos or soldered joints are present in the construction of the heater.

Before final location of the product the following criteria should always be considered in placing the heater: -

- Flue outlet access
- Placing for efficient distribution of warm air
- Gas supply
- Electrical services
- Combustion air supply (when applicable)
- Service access and maintenance requirements

Warnings

Heaters should not be installed in a corrosive or solvent atmosphere (i.e. near plating or degreasing plants), in areas where there is a fire risk, or any other environment, which is detrimental to the heater or its operation.

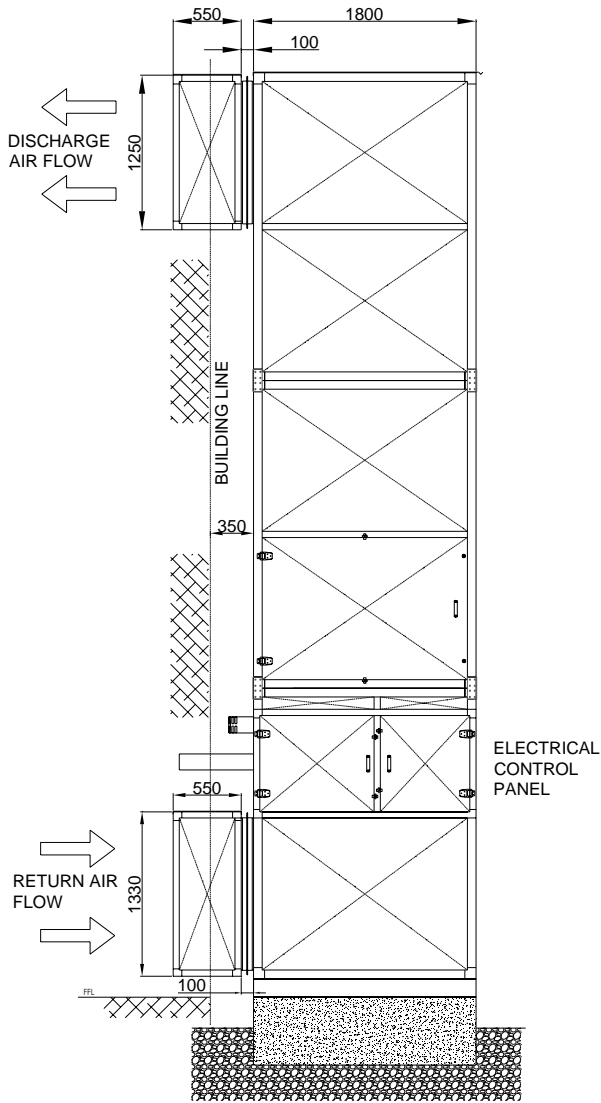
Consult BS 6230 for further information on hazardous arrears.

2. Technical Data.

Heater Ref.	Heat Output (kW) Max	Air Flow (m ³ /s) Max	Motor Size (kW)	Flue Dia (mm)	Heat input (gross)	Heat input (net)	Heat output (net)	Gas rate Nat Gas G20 (m ³ /h)	Gas rate Propane G31 (kg/h)
IDF8R8150V	150	8.16	4.0	130	182.9	164.8	150.0	17.44	12.85
IDF10R8200V	200	10.90	7.5	130	244.2	220.0	200.0	23.28	17.16
IDF13R8125VAR	250	13.60	2 x 3.0	2 x 130	306.9	276.6	250.8	29.26	21.56
IDF14R8150VAR	300	16.00	2 x 4.0	2 x 130	365.8	329.6	299.9	34.88	25.70
IDF16R8150VAR	300	16.30	2 x 4.0	2 x 130	365.8	329.6	299.9	34.88	25.70
IDF19R8175VAR	350	19.05	2 x 5.5	2 x 130	423.5	381.6	172.5	40.38	29.76
IDF21R8200VAR	400	21.78	2 x 7.5	2 x 130	488.4	440.0	400.0	46.56	34.32
IDF27R8200VAR	400	27.20	2 x 11.0	2 x 130	488.4	440.0	400.0	46.56	34.32
IDF32R8200VAR	400	32.65	2 x 11.0	2 x 130	488.4	440.0	400.0	46.56	34.32

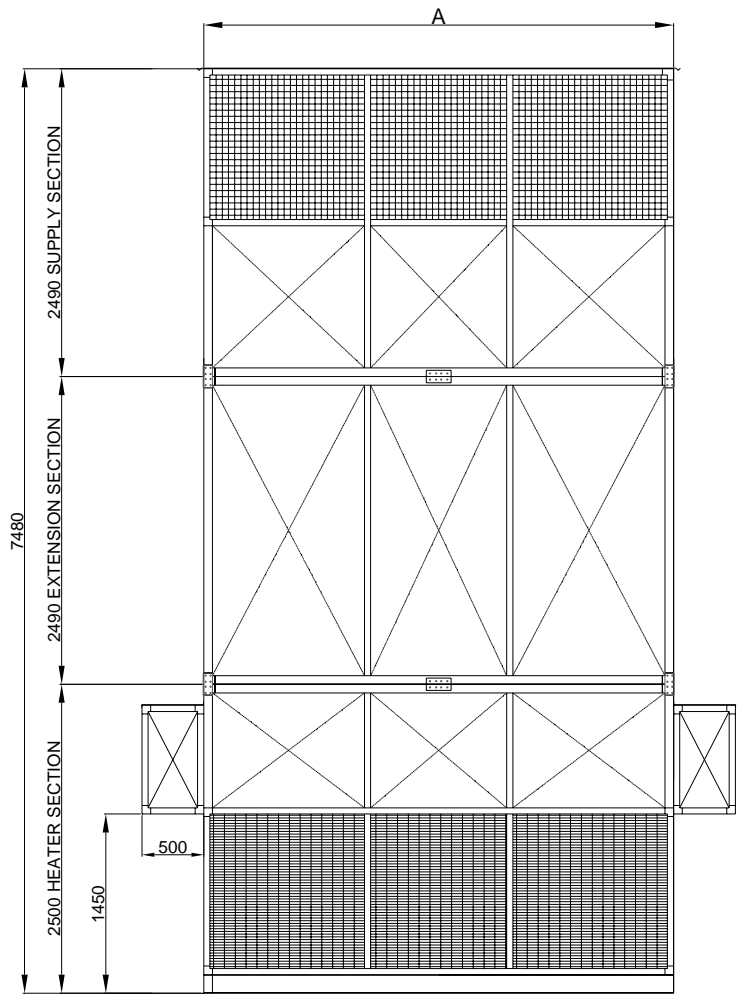
3. Overall Dimensions.

External Unit

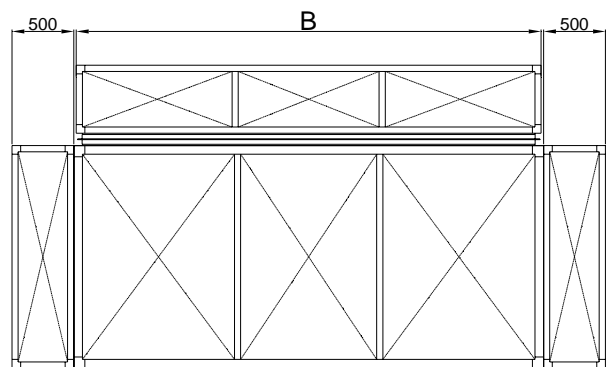


SIDE VIEW

CLIENT TO PROVIDE CONCRETE PLINTH TO SAME HEIGHT AS INTERNAL FINISHED FLOOR LEVEL



VIEW ON SUPPLY / RETURN AIR INLETS

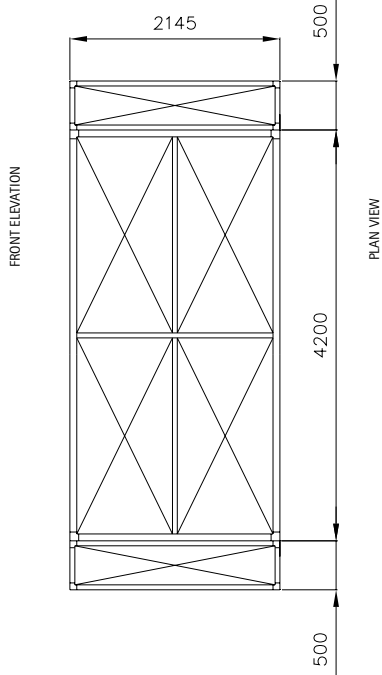
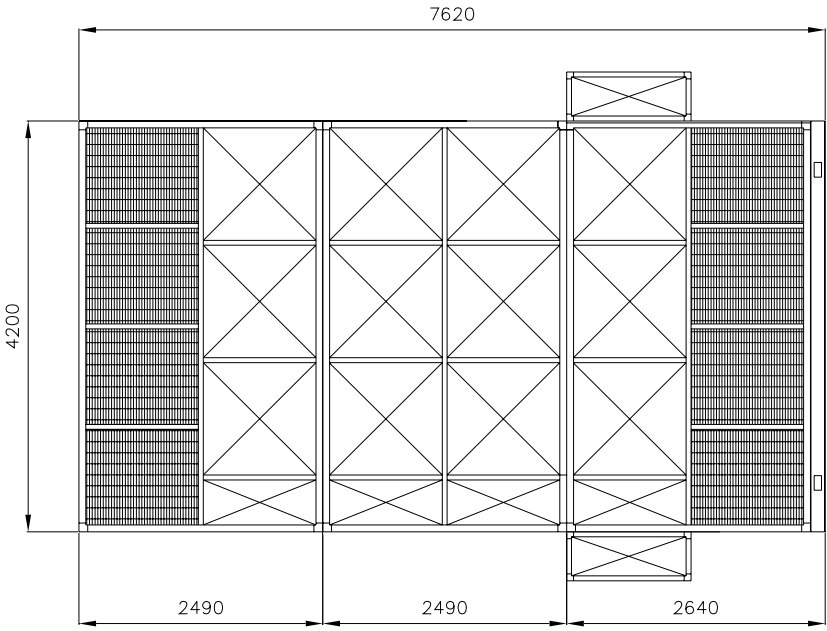


PLAN VIEW

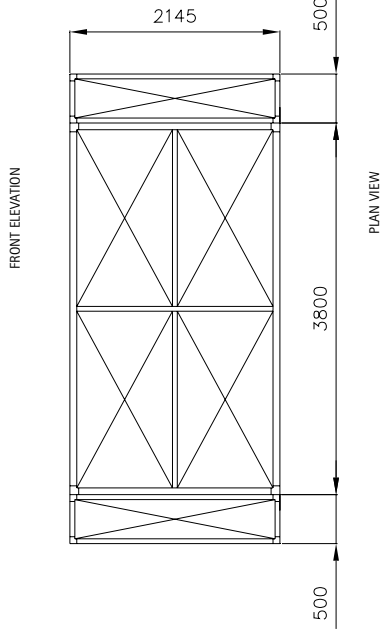
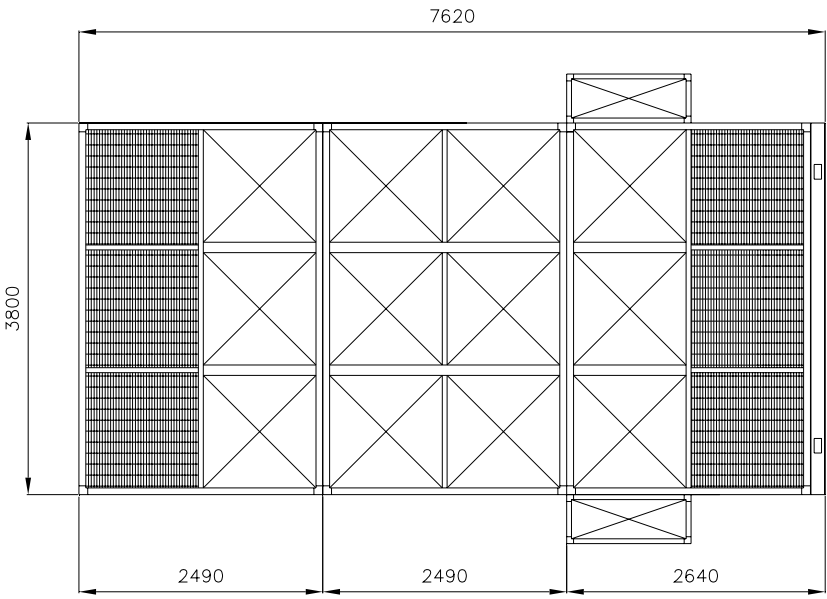
Ref.	IDF8R8150V	IDF10R8200V	IDF13R8125VAR	IDF14R8150VAR	IDF16R8150VAR
A				3800	
B				3760	
Ref.	IDF19R8175VAR	IDF21R8200VAR	IDF27R8200VAR	IDF32R8200VAR	
A					
B					

Internal Unit

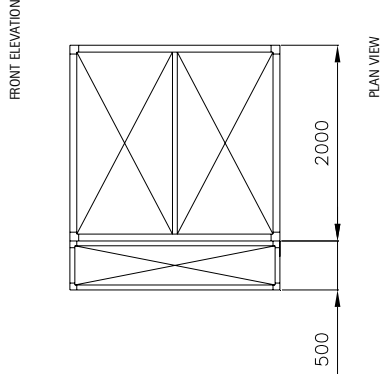
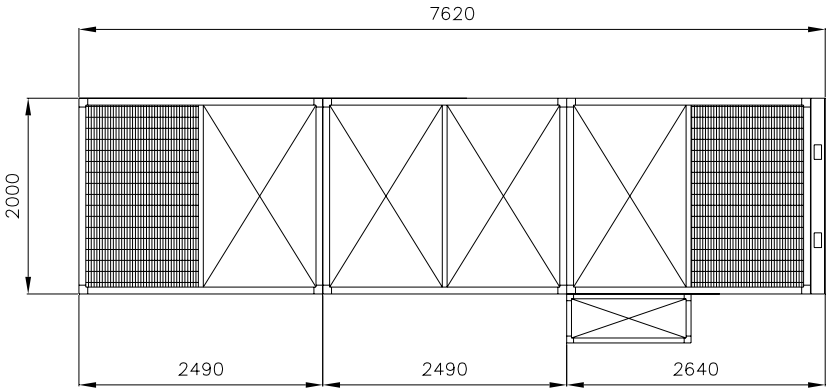
MODELS IDF27 & 32



MODELS IDF13 TO 21



MODELS IDF8 & 10



4. Installation Details.

4.1 Heater Installation

Check that the local electricity supply, type of gas and pressure of the appliance are compatible.

The air heater must be installed in accordance with the rules in force and the relevant requirements of any fire regulations or insurance company's requirements appertaining to the area in which the heater is located. The air heaters should not be located in hazardless areas. Consult BS6230 for guidance.

4.2 Clearances and Positioning:

The Air Heaters are mounted direct on the floor.

When designing a system, allowance must be made so equipment can be serviced after installation and for the fitting of any spares, which may be required.

Heaters must be installed with a minimum access clearance of 1 meter at each side for general maintenance purposes and operation.

Consideration should also be given to long term replacement of the heat exchanger section whereby a minimum access requirement of 1.8 meters would be required to withdraw and replace a heat exchanger section.



The unit should therefore not be sited any closer than this to permanent walls or immovable objects.

To allow adequate air distribution a minimum clearance of 5 meters should be maintained from the air outlet grilles.

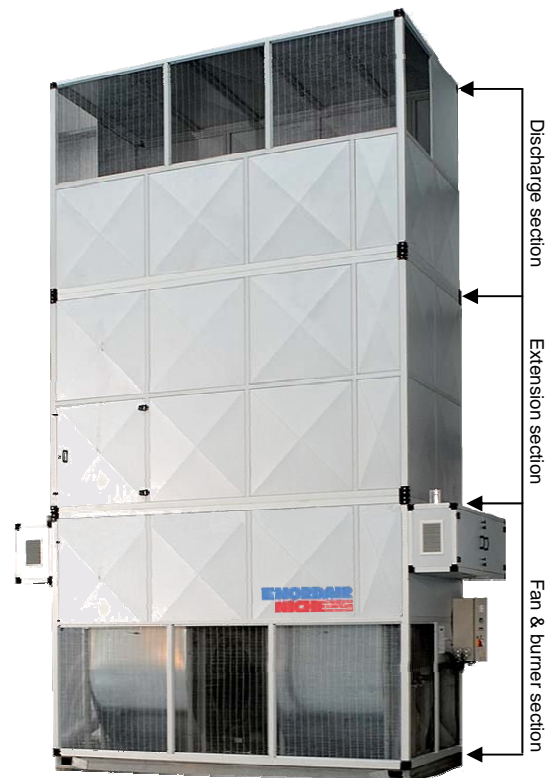
To enable the discharge section to be positioned using an extended Hiab crane as shown a minimum clear height above the heater of 1.5 meters is required.

WARNING!

No air heater shall be installed where there is a foreseeable risk of flammable particles, gases, vapours or corrosion inducing gases or vapours being drawn into either the heated air stream or the air for combustion.

4.3 Handling The Equipment.

The standard units are supplied in three sections. The base section is supplied complete mounted on a base frame complete with access points for lifting straps.



Each heater should be positioned onto a prepared flat level concrete floor or base (for external units) with a minimum size to suit the footprint of the heater.

Each section must be lifted into position using a suitably sized crane, with lifting bars or lifting straps threaded through the lifting points. When using lifting straps sling spreaders must be used to provide clearance between the appliance and the slings.



When siting the appliance and unloading, extreme care must be exercised to ensure that the slings employed do not damage the casing.

NB When lifting the main heater fan section sling spreaders must be used to provide clearance between the appliance and the slings



The mating faces of each section, are fitted with a sealing tape, and predrilled for bolting the sections together. Each section also incorporates a lifting bracket at each corner, to bolt the frames together these are replaced with assembly brackets once in the unit is in position and bolted together.

Finally the plates covering the lifting access points should be fitted to close the base frame and the base frame should be sealed around the external perimeter using the silicone sealant provided.



A full and unobstructed return air path to the air heater must be provided.

In addition, where there is a risk of damage to the unit caused by fork lift trucks etc then the unit should be protected with suitable barrier rails.



4.4 Ventilation Requirements

The space in which the heater is situated must be adequately ventilated. Consult BS6230:2005.

Where ventilation is required the minimum free area is shown below.

Low level:
540cm plus 4.5cm² per kW after 60kW

High Level:
270cm² plus 2.25cm² per kW after 60kW

5. Flue System & Combustion Air Supply.

5.1 Flue System

The flue system must be made to the following specifications:

1. Mechanically robust.
2. Resistant to internal and external corrosion.
3. Non-combustible and durable under the conditions to which they are to be subjected.
4. Aluminium or stainless steel flue is recommended.

The appliance has a fan assisted flue and a gasket sealed flue system should be used.

5.2 Design

Flue must be a type acceptable to current standards.

Facilities should be made for the disconnection of the flue from the heater to aid servicing and inspection.

This appliance does not require a draught diverter.

The products combustion must be flued to the outdoor atmosphere.

The flue should terminate in a freely exposed position and must be situated as to prevent the products of combustion entering the building via any opening.

Flues must be terminated with an approved terminal fitting.

The flue installation must be designed to the latest gas regulations and any local environmental standards. Flue systems must comply with national and local regulations.

The flue system must be supported independently and not supported by the unit.

Where a flue passes through a combustible roof, ceiling or floor, the flue pipe should be surrounded with a metal sleeve, the size of which should be sufficient to provide a space not less than 25mm between the flue pipe and the sleeve when positioned.

5.3 Maximum flue lengths

The fan assisted flues are suitable for a

maximum flue length of 14 meters when used as a type B fanned flued appliance i.e. the combustion air is drawn from the heated space.

When used as a type C balanced flue appliance with fresh air being drawn from outside for the combustion air supply the maximum flue length would be 9 meters plus 9 meters of combustion air pipe.

n.b. deduct 1.5 meters from flue length for every 90° elbow.

Heater Ref.	Flue Dia (mm)
IDF8R8150V	130
IDF10R8200V	130
IDF13R8125VAR	2 x 130
IDF14R8150VAR	2 x 130
IDF16R8150VAR	2 x 130
IDF19R8175VAR	2 x 130
IDF21R8200VAR	2 x 130
IDF27R8200VAR	2 x 130
IDF32R8200VAR	2 x 130

5.4 Flue terminal

An approved flue terminal must be fitted. Outlet openings should be provided preferably all round, or at least on opposite sides.

It is important that roof terminals are located so that it is not likely to be subjected to wind pressures which could restrict or reverse the flow of combustion products through the flue.

The ideal position is above the highest point on the roof. It is absolutely essential that the terminal is positioned so that it is freely exposed to any wind and is not shielded by any roof structure or object to such a degree that they create undesirable pressure regions around the terminal.

Preferred positions are:

- At or above the ridge of a pitched roof by means of a roof terminal.
- Above the intersection with a pitched roof.

The pitch or angle of the roof will determine the required flue height from the base of the terminal.

6. Gas & Electrical connections

6.1 Gas

Connection to gas service may only be carried out by appropriately qualified persons. The gas installation must comply with the rules in force using materials appropriate for gas installations. Check that the gas category is in accordance with the data described on the air heater.

An adequate gas supply sized to provide the dynamic pressure for the volume required for the air heater/s is essential to maintain the nominal heat input. Other gas fired plant using the same gas service must also be taken into account.

A 90° action, positive isolating ball valve must be fitted adjacent to the appliance, fitted in a manner to facilitate access to the burners for servicing purposes.

Ensure that the gas service has been tested and purged in accordance with prescribed practice prior to commissioning and setting the appliance into service.

Gas Connection Size

IDF	Pipe Size
IDF8R8150V	¾" BSP x1
IDF10R8200V	¾" BSP x1
IDF13R8125VAR	1¼" BSP x2
IDF14R8150VAR	1¼" BSP x2
IDF16R8150VAR	1¼" BSP x2
IDF19R8175VAR	1¼" BSP x2
IDF21R8200VAR	1¼" BSP x2
IDF27R8200VAR	1¼" BSP x2
IDF32R8200VAR	1¼" BSP x2

Ensure that the gas supply is filtered and it is free of swarf or debris before connecting to the appliance.

The minimum inlet gas pressure for natural gas should be 17.5mbar at the inlet when running. The appliance governors are suitable for a maximum supply pressure of 50mbar where gas supply pressures may exceed this value and additional gas pressure regulator must be installed in the supply line.

All gas pipe work and electrical connections must be adequately supported and must not support any of the heaters weight or rely on the strength of the burner gas pipe work.

6.2 Electrical

The electrical installation may only be carried

out by appropriately qualified persons observing the rules in force. The unit must be earthed.

Check the electrical specification is in accordance with the specification on the appliance data plate. A unique appliance wiring diagram is supplied as a separate document with the manual, plus an additional copy attached to the unit.

Ensure that power will be supplied at all times to the unit, even when it's control is switched in the "HEAT OFF" mode. This is necessary to ensure that the air circulating fan can operate independently of the heating control.

Where controls are not provided by Nordair Niche, then ancillary controls must be installed to provide timed heat cycles, room comfort temperature levels, frost protection, override of air circulation etc.

Before commissioning, any work on the appliance the Auto/Off/On switch should be switched to the 'Off' position and the air circulation fan(s) have stopped.

All cable and gas service entry points to outdoor appliances must be sealed to prevent ingress of water.

If it is necessary to change the rotation of blower to match the direction indicated on blower housing then three phase motors can be altered by switching two phases of the supply to the motor.

On units fitted with centrifugal forward curved fans, the speed setting for static pressure imposed by the air distribution system will govern the motor loading. The units are manufactured for the duty specified on the data badge.

Refer to section Drives general and adjustments for instructions on adjusting the fan speed and motor load factors.

After the electrical installation has been completed the appliance should be tested prior to the commissioning of the gas fired heat exchanger module(s).

Check to ensure: • Earth continuity • Resistance to earth • Phase supply to correct terminals • Current rating and circuit breaker value

In addition to the above requirements check to ensure that the fan performance and motor load factors are correct for the application and in accordance with the appliance data plate.

7. Commissioning & Testing

7.1 General

The Nordair Niche IDF unit is fitted with Indirect Gas Fired Heat Exchanger(s) as detailed in the technical data sheet. The following instructions must be read and understood prior to commencing work and must be followed for all commissioning and service operations.

Note Outdoor commissioning work on Nordair Niche appliances should not be undertaken during wet conditions.

Only persons formally qualified to work on gas fired apparatus may carry out commissioning and testing.

Visually check full system to see if it is in accordance with our manual and to current/CORGI legislation and IEE regulations and to this manual.

Check combustion air is adequate in plant room or surrounding area.

Check contractors electrical wiring is correct and terminated tight and fuse ratings are correct.

Ensure that the gas pipe work is sized correctly and relative documents for soundness and purging are available. It is the responsibility of the commissioning engineer to check for soundness from the main inlet to servicing stop tap on inlet of valve.

Ensure that the inlet pressure is no greater than 50mbar static and no less than 17.5mbar running.

On completion of the commissioning all adjustable devices are to be sealed with suitable tamper evident seal.

7.2 Electrical check

After completion of the installation and before switching on the electrical supply to the appliance, a qualified electrician must carry out a preliminary check. The following must be checked:

- Check to ensure that electrical cables/wiring do not touch the hot combustion collector box.
- Check that all wiring is connected in accordance with the appliance circuit diagram.
- Be certain that the correct fuse value and cable size has been provided.
- Check to ensure that the appliance is earthed by conducting an earth continuity test. Connect a test meter, one lead to the appliance earth terminal and the other to the mains incoming earth point at the electrical isolator. A resistance reading of 1,0 ohm or less must be indicated. If a higher reading is obtained, check all cable connections to ensure adequate security and cleanliness. If problem still exists, it may be necessary to consult the electricity supply undertaking.
- Carry out a polarity test. Connect one lead of a suitable AC voltmeter to earth and connect the other lead to the live supply terminal (L) at the air heater.
- Switch ON the power to the air heater and check for correct voltage. The same result should be obtained by connecting the test leads between live and neutral. Connect the voltmeter test leads to N and E. A reading of $\pm 0V$ should be obtained. If these tests do not conform with the above, there is a fault which must be rectified before proceeding further with the commissioning.
- Ensure that an electrical isolator with two pole separation with a minimum air break between poles of 3,0 mm has been fitted adjacent to the air heater.
- Check that the low and high level temperature sensor are fitted.
- Avoid location in draughty areas or where it may be influenced by heat sources e.g, the sun, process plants, etc. The low level temperature sensor or thermostat should be mounted on a vibration free surface and mounted about 1.5 metres above floor level.

7.3 Gas connection

The whole of the gas service installation including the meter must be inspected, tested for soundness and purged in accordance with current regulations.

Caution Never use a flame for checking gas soundness.

7.4 Adjustments

Burner gas pressure adjustment

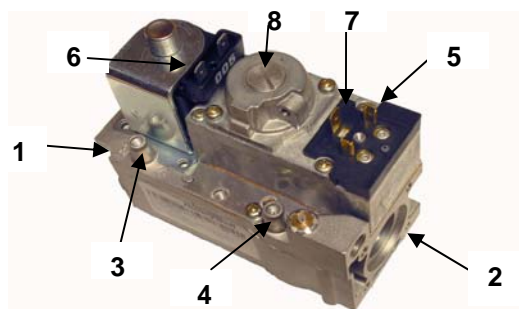
The gas pressure is set for the required heat input before the appliance leaves the factory, normally provided the gas supply to the air heater is in accordance with the supply pressure

described on the burner module data plate the operating pressure will not require adjustment.

To check the pressure, the following procedure should be carried out:

- Ascertain the appliance data plate the correct operating gas pressure for the air heater;
- Turn the room thermostat control to its lowest setting (see instructions of the air handler);
- Remove the screw from the outlet pressure test point of the multi-functional control valve. Connect a manometer to the test point;
- Adjust the room thermostat to call for heat e.g. above room ambient temperature;
- Observe the burner gas pressure on the manometer and compare to the required pressure (on/off system);
- If necessary, adjust the burner gas pressure. Remove the cover screw (Honeywell application)
- Turn the regulator screw anti-clockwise to decrease pressure or clockwise to increase pressure;
- Set room thermostat to lowest setting to turn OFF the burners. Replace the test point screw (if removed) and with the main burner alight, test for gas soundness using a soapy solution.

Reset temperature control/room thermostat to comfort operating level.



Honeywell gas valve

- 1 gas inlet
- 2 gas outlet
- 3 inlet pressure gas test point
- 4 burner pressure gas test point
- 5 6.3mm AMP terminals and screws
- 6 6.3mm AMP terminals
- 7 Earth terminal/screw (line voltage only)
- 8 Pressure regulator adjustment screw

7.5 Air Heater Controls and Operation

Check air heater operation after all burner module adjustments have been completed. Set the temperature control above ambient temperature.

The air heaters are fitted with a pressure sensitive, combustion air safety control that monitors pressure differential of the combustion airflow. The control operates with the settings given in the table below (settings are for sea level installations)

Heater Ref.	Normal equilibrium warm (Pascal)	Set point 'off' (Pascal)
IDF8R8150V	250	200
IDF10R8200V	200	180
IDF13R8125VAR	310	250
IDF14R8150VAR	250	200
IDF16R8150VAR	250	200
IDF19R8175VAR	140 (95)	110 (75)
IDF21R8200VAR	200	180
IDF27R8200VAR	310	250
IDF32R8200VAR	250	200

7.6 Combustion air pressure control settings.

When the combustion air safety control closes verifying airflow, the gas control valve will open and the burner will light. If the burner does not light, the ignition controller will lockout and must be manually reset. The air heater is fitted with a signal lamp and manual reset button that indicates lockout.

NOTE: If the first reset is not successful wait 15 seconds before resetting the igniter.

Wait approximately 30 seconds after the burner has lit, the time delay relay will activate the thermal fan control and will also activate the fan if wired (most air handlers are equipped with constant running fans). Continue to operate the air heater for several minutes to ensure correct operation.

Turn room thermostat to its lowest setting. The main burners should extinguish while the fan continues to run to cool the air heater. The fan delay relay will normally be de-energized and stop the fan motor in approximately 45 seconds (if wired).

7.7 Burner Options

7.7.1 Two stage burner control

Description

This option provides a 2-stage burner control system providing 100% & 50% heat input.

Appliances so equipped will only operate in a two stage manner when connected to a two stage external control (room thermostat) or duct stat.

Important

Safe operation of the burner is only assured when the low rate setting is 50% or greater than the high rate setting.

The low rate gas setting pressure should therefore never be less than 25% of the normal high rate setting pressure. See table included in this document.

Nomenclature

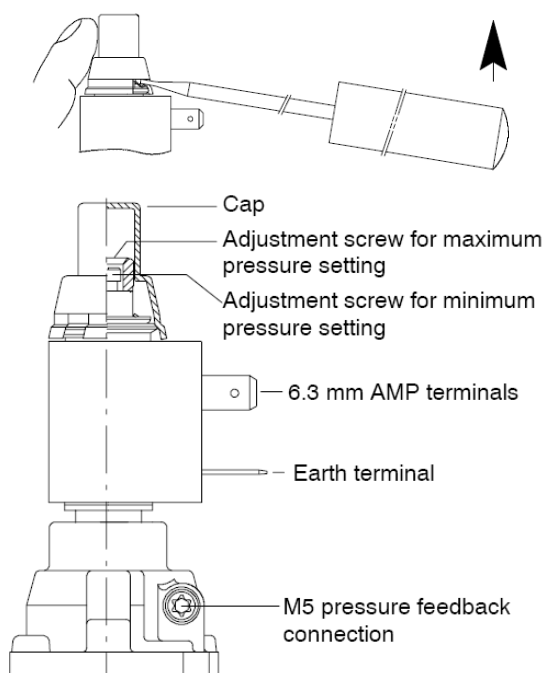
This option may only be used in conjunction with appliances fitted with Honeywell multi-functional gas controls types VR4601P... or type V4600P... The valve operator V4336A... 3/20 for natural gas or V 4336A..4/37 for propane gas may be used to replace the single stage gas regulator already fitted if conversion is being under taken.

Regulation is possible for the pressure range 3-20 mbar for natural gas and 4-37mbar for propane gas. A relay in the burner controls circuit is necessary to ensure that burner start-up takes place on high fire rate so that good main burner cross lighting takes place.

Note:

The maximum gas pressure for all gas valve types is 50 mbar.

The following diagram shows in outline view the valve operator and indicates it's principal components.



Care should be taken when handling the operator for the purpose of replacement or exchange. If upgrading of an existing single stage valve is being carried out then the gas valve must be marked accordingly to ensure that replacement parts for the future are readily identified.

Field adjustment & check-out

Important

1. Fitting and adjustment may only be carried out by qualified persons.
2. Allow time for pre-set pressure to stabilise before making adjustments i.e. 1 minute.
3. Operate high-low regulator a few times after adjustment to ensure correct setting.
4. Remove cover cap as indicated above.

Setting (refer to sketch opposite)

- Lever off cover cap as indicated.
- Before commencing an adjustment connect a manometer to the burner pressure test point.
- Maximum high 'rate' setting **must** be adjusted first after which the minimum low 'rate' setting can be adjusted. Any adjustment of the maximum setting influences the minimum rate setting.
- do not adjust maximum or minimum settings above or below the pressure stated on the data plate or in table below.

Adjusting maximum pressure

- energize high-low regulator, set gas control in operation (light burner) and wait until an outlet pressure is recorded on pressure gauge.
- use a 6mm hexagon wrench or a 10mm screw drier to turn adjustment screw for maximum pressure setting, clockwise to increase counter clockwise to decrease pressure until the desired maximum pressure is obtained.
- check maximum pressure several times.

Adjusting minimum pressure setting

- disconnect electrical connection of high-low regulator.
- set gas control in operation and wait until an outlet pressure is recorded on the pressure gauge.
- if minimum pressure setting needs adjusting use a 3,5mm screw driver to turn adjustment screw for minimum pressure setting clockwise to increase counter clockwise to decrease pressure until desired minimum pressure is obtained.
- re-connect high-low regulator in circuit.
- check maximum pressure setting, re-adjust if necessary and check minimum pressure again.

Replace regulator cap when finished.

Models High/Low burner gas pressures and low rate consumption values

Heater Ref.	Burner pressure 100%		Burner pressure 50%	
	NG G20 mbar	prop G31 mbar	NG G20 mbar	prop G31 mbar
IDF8R8150V	7.30	34.8	1.83	8.70
IDF10R8200V	7.70	33.7	1.93	8.43
IDF13R8125VAR	7.10	35.4	1.78	8.85
IDF14R8150VAR	7.30	34.8	1.83	8.70
IDF16R8150VAR	7.30	34.8	1.83	8.70
IDF19R8175VAR	7.70	34.7	1.93	8.68
IDF21R8200VAR	7.70	33.7	1.93	8.43
IDF27R8200VAR	7.70	33.7	1.93	8.43
IDF32R8200VAR	7.70	33.7	1.93	8.43

Natural gas G20 gross calorific value 10.48 kWh/m³ at 15°C & 1013 mbar

Propane gas G31 gross calorific value 14.0 kWh/kg

Note :

Burner pressures for butane/propane gasses are approximate based on regulated supply pressure :

Calculation burner pressure : burner pressure at 100% input x (load)²

Note : It is necessary to re-check pressure settings during routine service and maintenance of the appliance.

7.7.2 Modureg V7335A 2000 series modulation system

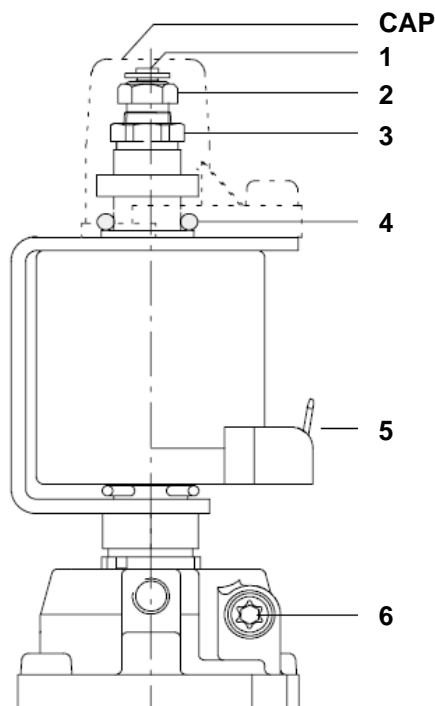
The Modureg V7335A 2000 Series Modulating gas pressure regulators are an optional addition which can be used on "Honeywell" Multifunctional gas controls for modulating the burner gas pressure for firing over the range 50% to 100% of the nominal high fire burner rate. Two model types are used dependant on the gas type. They are identified Grey cover = Natural gas, outlet pressure range 1,5 - 20,0 mbar. Yellow cover = Propane/Butane gas, outlet pressure range 4,0 - 37,0 mbar

Caution:

The air heaters must be controlled so that burner start-up takes place in the high fire (100%) mode.

Modureg gas pressure regulators require to be powered by a maximum 24 V DC voltage over the range 15 - 165 mA maximum. Maximum outlet pressure occurs at the high set point value (high fire). Minimum outlet pressure occurs at low set point value (low fire). The power signal may be obtained from a system amplifier which may be an integral control within the appliance or from a remote control system designed to provide the required controlling voltages.

Adjusting the V7335A Regulator



Legend.

- 1 shaft
- 2 adjustment screw (7mm) for MAXIMUM pressure setting
- 3 adjustment screw (9mm) for MINIMUM pressure setting
- 4 'O' RING
- 5 63mm AMP terminal
- 6 M5 pressure feedback connection

To check the minimum or low fire and maximum or high fire pressures for limits of modulation use the following procedures.

Fit a manometer to appliance burner pressure test point.

Important :

Allow time for gas pressure to stabilise before making adjustments.

To Set Minimum (low fire) 50% or 30% rate (see table)

1. Remove regulator cover cap;
2. Disconnect electrical connection to the regulator coil;
3. Energise operator, set control in operation and wait until outlet pressure is recorded on manometer;
4. Use a 9 mm wrench to turn the minimum rate adjustment screw clockwise to increase or counter-clockwise to decrease the minimum pressure setting

The minimum pressure setting must be adjusted first, because any adjustment of the minimum pressure setting influences the maximum pressure setting.

To set Maximum (high fire) 100% rate

1. Follow point 1 above. Connect electrical connection to the regulator coil and ask for maximum heat;
2. Using a 7 mm wrench to turn the maximum adjustment screw clockwise to increase or counter-clockwise to decrease the maximum pressure setting to the value stated on the appliance data plate;
3. Replace cover cap, re-wire coil in circuit;
4. Operate burner several times in high, intermediate and low-pressure modes and check performance on the manometer.

Fault finding “Modureg” operation:

Follow setting procedure for fault finding

1. Minimum or Low Fire unobtainable :
 - Ambient temperature too high in location of regulator max 70°C;
 - Check input voltage to coil, Zero volts is low fire mode, shaft out;
2. Cannot obtain Maximum or High fire :
 - Open circuit to regulator coil; Measure coil resistance = 127 W;
 - Short circuit between coil and casing; Check resistance between one terminal and casing, reading indicates short circuit;
 - Low voltage to regulator; Check for correct voltage range, should be: 0 - 24 V DC;
 - Low gas supply pressure; Check natural gas GB = 17.5-20.0 mbar. Push down plunger, burner pressure should rise to high-fire rate;
3. Erratic operation:
 - Fluctuating or pulsating DC voltage ;

Check using meter, if pulsating suspect input signal, transients, etc...

4. Minimum rate lower than setting required or below 1.5mbar :

- Minimum pressure set too low; re-adjust;
- Line supply gas inlet controls regulator faulty or requires adjustment; Appliance gas tap not fully open

7.8 Drives general and adjustments

The drive assembly of Nordair Niche Air heaters are enclosed within the unit. Alignment and belt tensions should be checked prior to start up, as described later.

It will be necessary to remove the access panels or open the hinged access door.

Before commencing work on the fan assembly:

- Turn Auto/Off/On to Off
- Ensure that the gas supply to the air heater is turned OFF
- Switch OFF the electricity supply to the air heater after the air circulating fan has stopped
- Remove protection panels as necessary and carry out inspections/belt tensioning as appropriate
- Before placing the appliance back into service or switching the fan on ensure that all protection access panels are replaced and secured or the access door is locked and the key returned to the end user

Units are set at the factory for the fan speed required to meet the airflow required.

Ensure that the motor load rating is not exceeded.

Any rotational speed checks should be carried out using a stroboscope or an infra red tachometer.

If adjustment is required this will require a pulley change. Ensure that the motor load rating is not exceeded.

On completion of the commissioning all adjustable devices are to be sealed with suitable tamper evident seal.

8. Routine Maintenance Schedule.

	Monthly	3 Monthly	6 Monthly	Annually
Fan shaft bearings				x
Motors				x
Belts and Pulleys		x		
Heat Exchangers				x
External surfaces				x

8.1 Invalidation of guarantee

The following misuses or maltreatment of Nordair Niche equipment will render all guarantees, as set out on the Conditions of Sales, void.

- Failure to install, set up or put to work any part of the equipment as specified in Nordair Niche installation, operation and maintenance instructions.
- Attempting to operate motors and other electrical equipment with an electrical supply other than that designated on the motor nameplate, or failing to connect and protect such equipment in accordance with I.E.E Regulations and local by-laws.
- Failure to notify Nordair Niche of equipment damaged on receipt in writing within five days.
- Failure to run equipment within the design specifications as notified at the time of order.
- Modifications to designed arrangement or performances without the prior written approval of Nordair Niche.
- Damage caused to equipment on site through lack of adequate protection from the elements or misuse by other trades.
- Failure to observe all normally accepted engineering practices during installation, commissioning and subsequent operation of equipment.

	Force required to deflect belt 16mm/m of span	
	Small Pulley diameter	Kg force
SPZ	56 - 95 mm	1.3 - 2.0 kg
	100 - 140 mm	2.0 - 2.5 kg
SPA	80 - 132 mm	2.5 - 3.6 kg
	140 - 200 mm	3.6 - 4.6 kg
SPB	112 - 224 mm	4.6 - 6.6 kg
	236 - 315 mm	6.6 - 8.7 kg
SPC	224 - 355 mm	8.7 - 11.7 kg
	375 - 560 mm	11.7 - 15.3 kg

Calculate the deflection distance in mm on a basis of 16mm per metre of centre distance.

- Set the lower marker ring at the deflection distance required in mm on the lower scale.
- Set the upper marker ring against the bottom edge of the tube.
- Place the belt tension indicator on top of the belt at the centre of the span, and apply a force at right angles to the belt deflecting it to the point where the lower marker ring is level with the top of the adjacent belt.
- Read off the force value indicated by the top edge of the marker ring.
- Compare this force to the kgf value in the table above.
- If a belt tension indicator is not available, a spring balance and rule will suffice.

Important

After the drive has been running for approximately 30 minutes, the tension should be checked and re-adjusted to the higher value, is necessary.

8.2 Servicing

PLEASE NOTE SERVICING MUST ONLY BE CARRIED OUT BY A COMPETENT REGISTERED ENGINEER (CORGI)

BEFORE CARRYING OUT ANY WORK ON THE UNIT SEE THAT THE ISOLATING SWITCH IS IN THE 'OFF' POSITION AND THE GAS SUPPLY IS SHUT OFF.

TO COMPLY WITH CE CERTIFICATION, REPLACEMENT PARTS MUST BE SUPPLIED BY NORDAIR NICHE OR THEIR RECOMMENDED SUPPLIER.

INFORMATION IS FOR GUIDANCE OF QUALIFIED SERVICE ENGINEERS ONLY

WARNING:

EXCESSIVE DIRT BUILD UP ON THE INSIDE OF THE BURNER PORTS COULD CAUSE UNBURNED GAS TO SPILL OUT OF THE BACK OF THE BURNER TUBE CAUSING A FIRE OR EXPLOSION. TO PREVENT THIS OCCURRING, CLEAN ALL OF THE BURNER PORTS AT LEAST ANNUALLY.

CAUTION:

WHEN CLEANING AIR HEATERS, WEARING OF EYE PROTECTION AND A DUST FACEMASK IS RECOMMENDED.

Note: We recommend that the Heater is fully serviced every year and re-commissioned. If the flue gas passages in the heat exchanger, the combustion chamber, or in the flue chamber are blocked, the Heater can overheat causing the unit to shut down on the overheat thermostat.

8.2.1 Note: Regarding External Heaters

Please note in extreme weather conditions, always ensure any electrical connections etc are protected and do not allow water onto them.

8.2.2 Wet Conditions

If it is found that the area in which the heater is installed has become wet/flooded, the heater must be electrically isolated immediately and an investigation to find out if any water has penetrated into the heater controls. If so, ensure they are dried out properly before re-installing the electric supply.

8.3.1 Recommended intervals

Annual Inspection:

- Clean heat exchanger surface.
- Inspect and align fan and motor pulleys. Check the tightness of the motor bolts.
- Adjust fan belts for tension.
- Inspect and adjust electrical connections.
- Check all wiring and tube connections.
- Remove the burner inner assembly – clean and replace.
- Start the Heater and check CO readings, stack temperature efficiency and CO₂ level.
- Check the combustion air supply.

8.3 Burner Maintenance

8.3.1 Burner.

- Remove the burner assembly as in section 9. Clean thoroughly, (cleaning the burners requires an emery cloth, wire brush and a cleaning cloth -stubborn deposits on burners are best cleaned using "**acetone**" as a solvent).
- Check the condition of the igniter and clean to remove all deposits. Check the spark gap (3,0 mm).
- Check the sensor - clean as necessary.
- Remove any soot deposits from the burner with a wire brush. Clean the ports with a degreaser or acetone. A vacuum cleaner or compressed air may assist in this cleaning operation. Wipe the inside of the burner tube clean (cleaning thoroughly with a degreaser as recommended will retard future build up of dirt).
- Inspect the burner for any damage or deterioration. If the burner is damaged or corroded, replace it.

8.3.2 Heat exchanger

- The heat exchanger should remain clean unless a problem has developed due to poor combustion. Examine the heat exchanger tubes internally and externally for any sign of deterioration. The outside of the tubular heat exchanger can be cleaned from the front of the heater with an air jet and/or a flexible brush. Remove any dust and grease deposits.

- The inner surfaces of the heat exchanger can be reached for cleaning with the burner and combustion air fan (venter) assemblies removed, (see section 9). Clean with a flue brush or a heavy wire to which wire wool has been attached. Brush inside each heat exchanger tube until all foreign material has been removed. The use of a flashlight is necessary to carry out this operation.

8.3.3 Gas control valves maintenance:

- No regular maintenance is required on these devices. Please refer to section for removal or replacement of parts.

Replace faulty gas valve with genuine Nordair Niche Heater replacement part; failure to do so could result in death, injury and damage to property

Note! Check all gas pipes and joints to ensure there are no cracks or gas leaks. Any cracks in the pipe work or joint must be repaired.

8.3.3 Flue/Combustion fan

- Remove any dirt and/or grease that may have accumulated on the venter fan motor and its housing. **NOTE:** Venter fan motors are lubricated for life and do not require greasing.
- Check the flue/combustion air system for soundness. Reseal/replace any parts that are not sound.

8.3.4 Fan Assembly

- Inspect the fan blades to see they are not damaged and that there is no excessive building up of deposits that could give an imbalance via access panel on the side of the heater. If necessary clean the fan blades.
- The main fan bearings are permanently sealed and do not require lubrication.
- Check belts for signs of wear and replace if required.

8.3.5 General

- Check all wiring connections. Check wiring for any signs of damage. Replace any suspect wiring with an equivalent specification.
- Check operation of thermal fan control and control relay.

8.4 Cleaning Of Heater:

The heater can be cleaned externally using a damp cloth with a light detergent.

Please note: this is on the outer panel only, away from all of the electrics. No substance can be used that will cause harm to the surface of the metal, or remove paint etc.

8.5 Re-commissioning

After servicing the heater must be re-commissioned in accordance with the commissioning section of this manual.

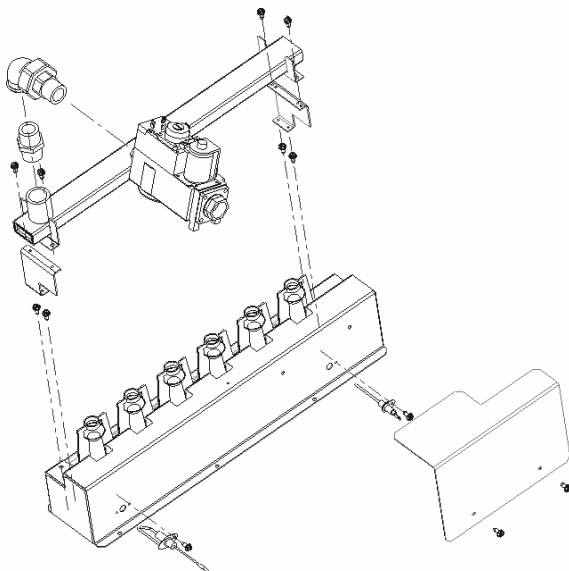
9. Removal & replacement parts

9.1 Burner removal

9.1.1 Instructions for burner removal (see figure below):

1. Turn OFF the gas supply to the air heater.
2. Switch OFF the electricity supply to the air heater.
3. Open the access door.
4. Disconnect the union in the gas supply outside of the appliance.
5. Remove gas supply pipe from multi-functional gas control valve.
6. Disconnect flame sensor wire from flame sensor and the high tension ignition wire from the burner relays.
7. Disconnect the silicon tube from the static tapping point on the burner box cover.
8. The burner rack assembly is now visible.
9. At the bottom and top of the burner rack assembly, remove the 2 nuts that secure the burner rack to the burner box bottom and top. Lift the burner rack/manifold assembly upward and pull the assembly out of the air heater.

Figure 13 :
Removing the burner rack/manifold assembly (for clarity, the heater cabinet & other parts are not illustrated). Do not remove the burner box assembly from the heater.



9.1.2 Instructions for re-assembly:

1. Reverse the procedure for removal making sure that all parts are installed correctly. Check that all components are secure and check wiring.

2. When lighting, always follow the lighting instructions on the air heater.

Remember! After any service work has been carried out, the air heater must be fully commissioned.

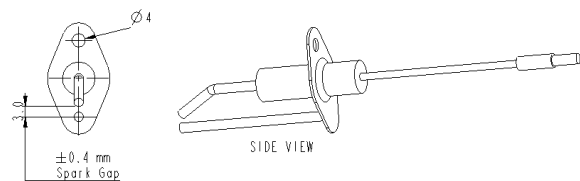
9.2 Burner injectors

1. Carry out steps 1 to 8 of section 'Burner removal'.
2. Unscrew the main burner injectors.
3. Re-fit new injectors.
4. Re-assemble in reverse order.

9.3 Ignition system

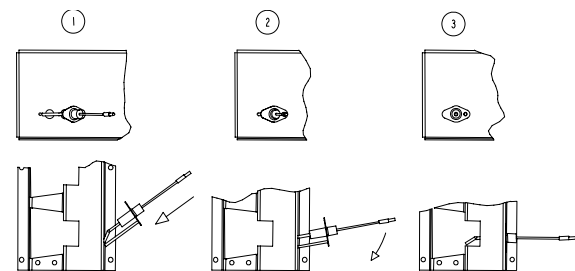
To access the ignition system, follow steps 1 to 3 in 'Burner removal'.

Igniter - Locate the igniter (on the side of the burner rack). Disconnect the wire, remove the screw and the igniter. Clean with an emery cloth. Note: Spark gap must be maintained to 3.0 mm (see diagram below).



The diagram below shows how the igniter must be installed.

IMPORTANT: When re-assembling the earth wire must remain attached to the igniter



CAUTION: Due to high voltage on the spark wire and electrode, do not touch when energized. See hazard levels.

Flame sensor - Locate the flame sensor. Disconnect the wire, remove the screw and the flame sensor. Clean with an emery cloth.

Ignition controller - The enclosed integrated circuit monitors the operation of the burner including ignition. Do not attempt to dismantle the ignition controller. Each heating season lead wires should be checked for insulation deterioration and good connections.

Proper operation of the direct spark ignition system requires a minimum flame current of 1,0 microA when measured with a micro ammeter.

For further information and checkout procedure of the direct spark ignition system, refer to the manufacturers control operating instructions a copy of which is supplied with the air heater.

9.4 Multi-functional gas control valve

1. Ensure gas supply to the air heater is turned OFF.
2. After the air circulation fan has stopped, switch OFF the electricity supply to the air heater.
3. Mark for future identification and disconnect the wires connected to the valve.
4. Disconnect the gas service union between the control valve and the gas service tap. Remove the gas control valve.
5. Re-fit a replacement valve making all of the required connections.
6. Carry out complete commissioning procedure prior to placing the appliance back into service.

CAUTION:

The gas control-operating valve is the prime safety shut-off. All gas supply lines must be free of dirt, scale, etc. before connecting to the air heater thus ensuring positive closure of the control valve.

9.5 Thermal overheat (Limit) controls.

If it is determined that the thermal overheat control needs replacing, use only authorized replacements that are designed for this appliance.

To gain access to the control, open the hinged controls compartment access door. The control near the top of the air heater is a disc type control. The lower one is a capillary type one with a capillary tube that extends into the heat exchanger area.

To remove the controls, disconnect the wires leading to them, remove the fixing screws and

lift clear of the inner-casing panel.

NOTE: The capillary control is fitted to a bracket. With the bracket removed from the air heater, remove the control from the bracket.

When replacing the capillary control be careful not to damage the capillary tube by kinking. Make bends with a generous radius (± 25 mm). When replacing the disc type control never manually attempt to operate the disc by pushing on the disc. Doing so will alter the calibration and could be hazardous.

9.6 Combustion air control pressure switch

If it is determined that the air differential pressure switch needs replacing, use only authorized replacements that are designed for the air heater being serviced. These switches are calibrated to operate at the designed combustion airflow duty for each appliance size in the product range.

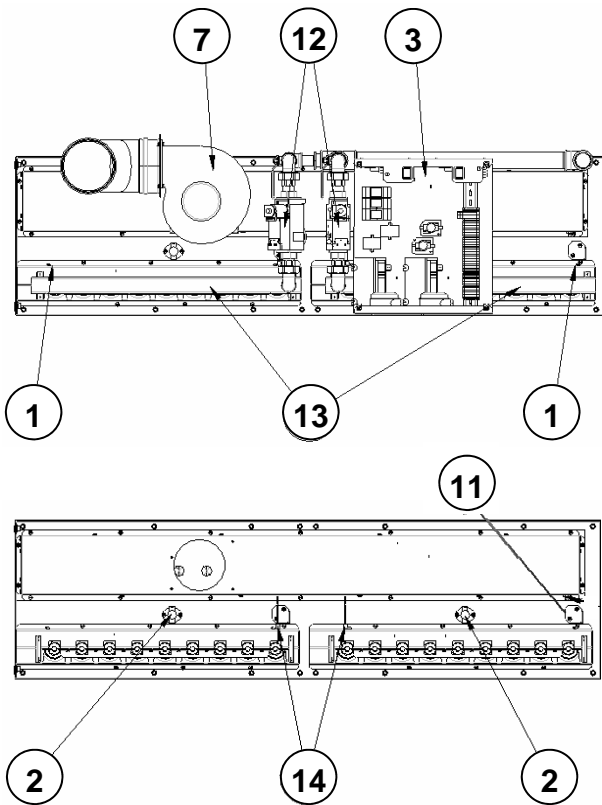
9.7 Combustion air fan (venter)

1. Ensure gas supply to the air heater is turned OFF
2. After the air circulation fan has stopped, switch OFF the electricity supply to the air heater.
3. To gain access to the fan open the controls compartment access door.
4. Mark for future identification and disconnect the wires connecting the fan motor at the terminals on the main wiring junction.
5. Remove combustion air fan and clean as necessary using a wire brush and solvent to remove sticky residues.
6. Re-assemble and check for free rotation before proceeding to test the appliance.

9.8 Main Supply fan

1. Isolate electric supply.
2. Remove front lower access panel.
3. To remove fan belt, slacken both adjustment bolts on motor plate by turning anti-clockwise.
4. Disconnect fan motor electrics.
5. Remove motor on motor plate and undo x4 bolts, Note, you will require x4 locking nuts on replacement.
6. Re-assemble in reverse order.
7. Re-tighten the supply fan belt until 12mm movement is obtained.
8. Check fan rotation is correct.

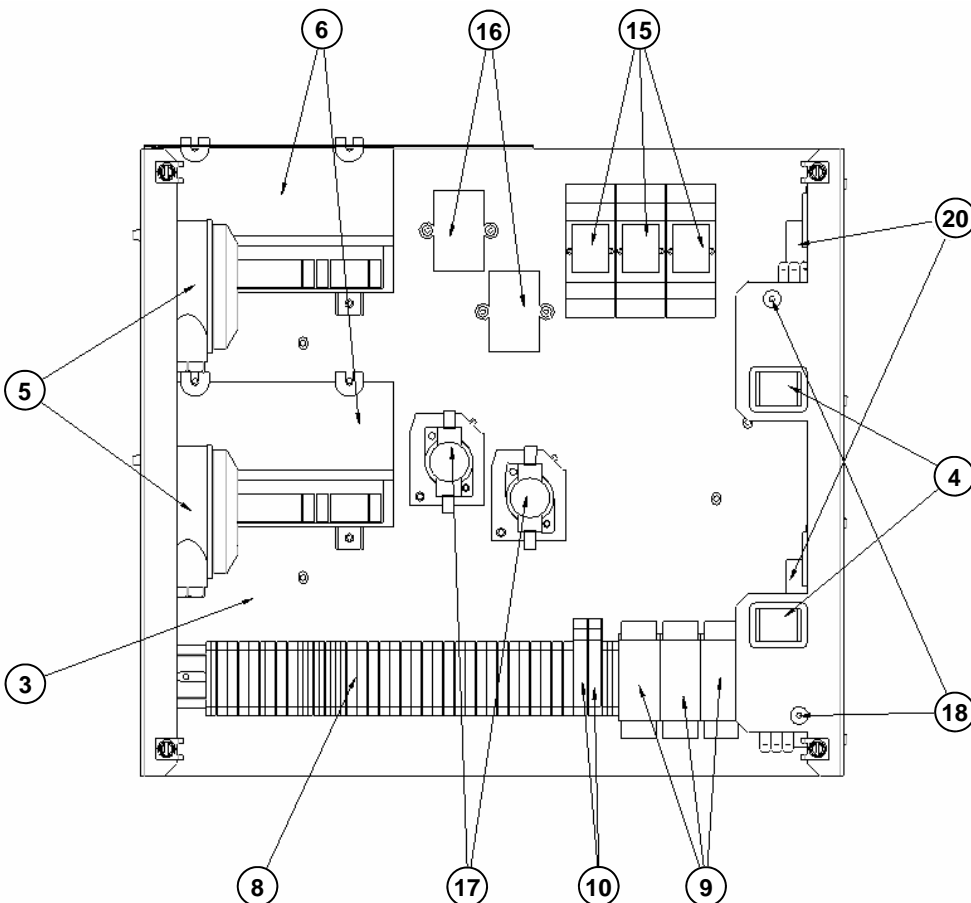
9.9 Internal parts location



Legend

1. Flame sensor
2. LC1 limit control (without reset)
3. Electrical wiring panel
4. Reset lockout signal lamp
5. Differential pressure switch
6. Burner control relay or ignition controller
7. Flue gas extractor for combustion products
8. Electrical connectors
9. Time delay relay
10. Fuseholder with fuse
11. Differential pressure point
12. Combination gas valve with pressure regulation
13. Manifold & injectors
14. Ignition electrode
15. Relay K1.2 (not applied in case of modulation)
16. Electronic net filter
17. Fan control relay
18. LC3 max limit controller with manual reset
20. GM 44

Controls section



9.10 Spare Parts

Please refer to gas burner supplement supplied with this manual.

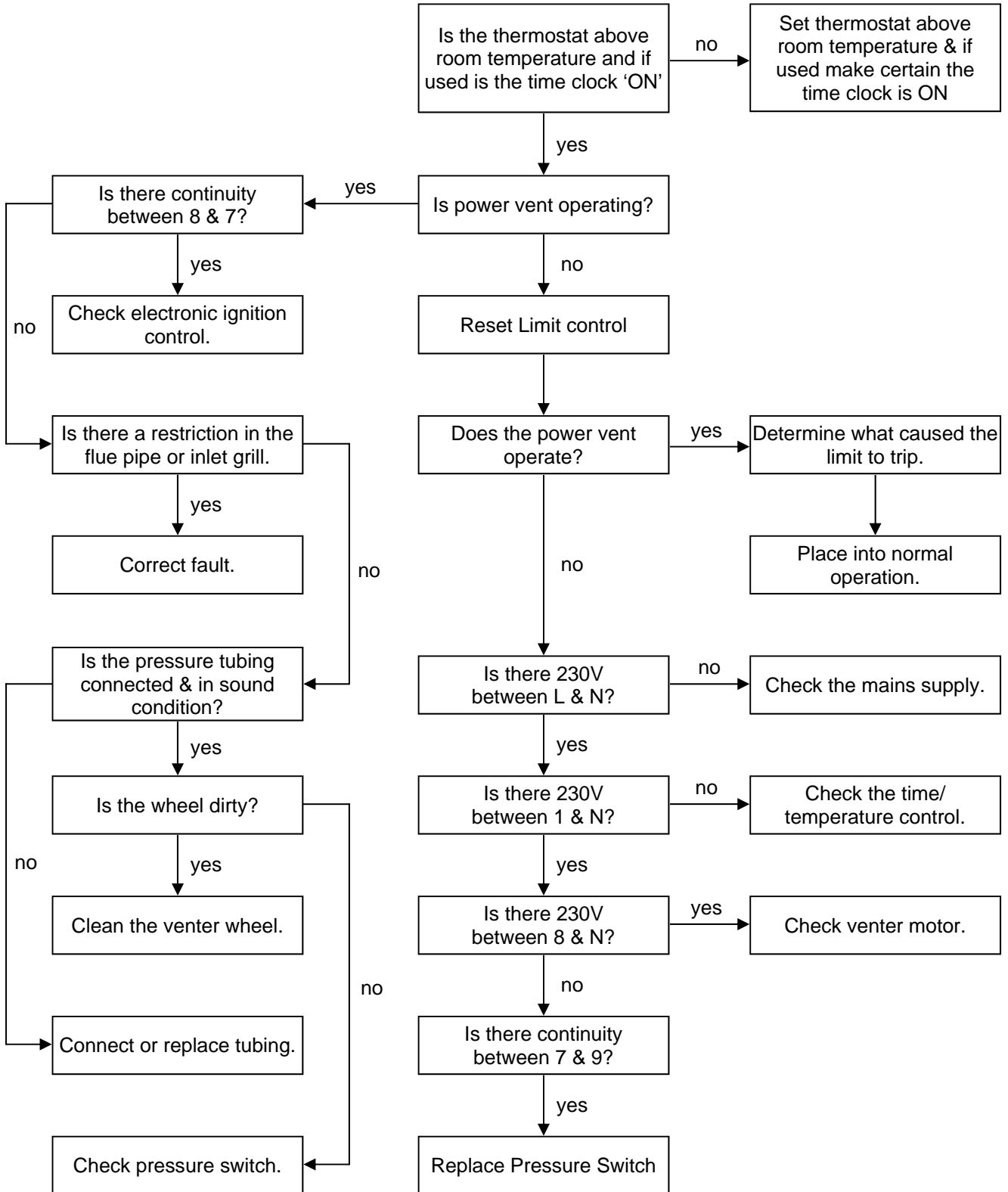
All components can be purchased from Nordair Niche.

Only use parts recommended by Nordair Niche or other wise stated in this manual. You must first contact Nordair Niche if you want to use alternative parts

10. Troubleshooting.

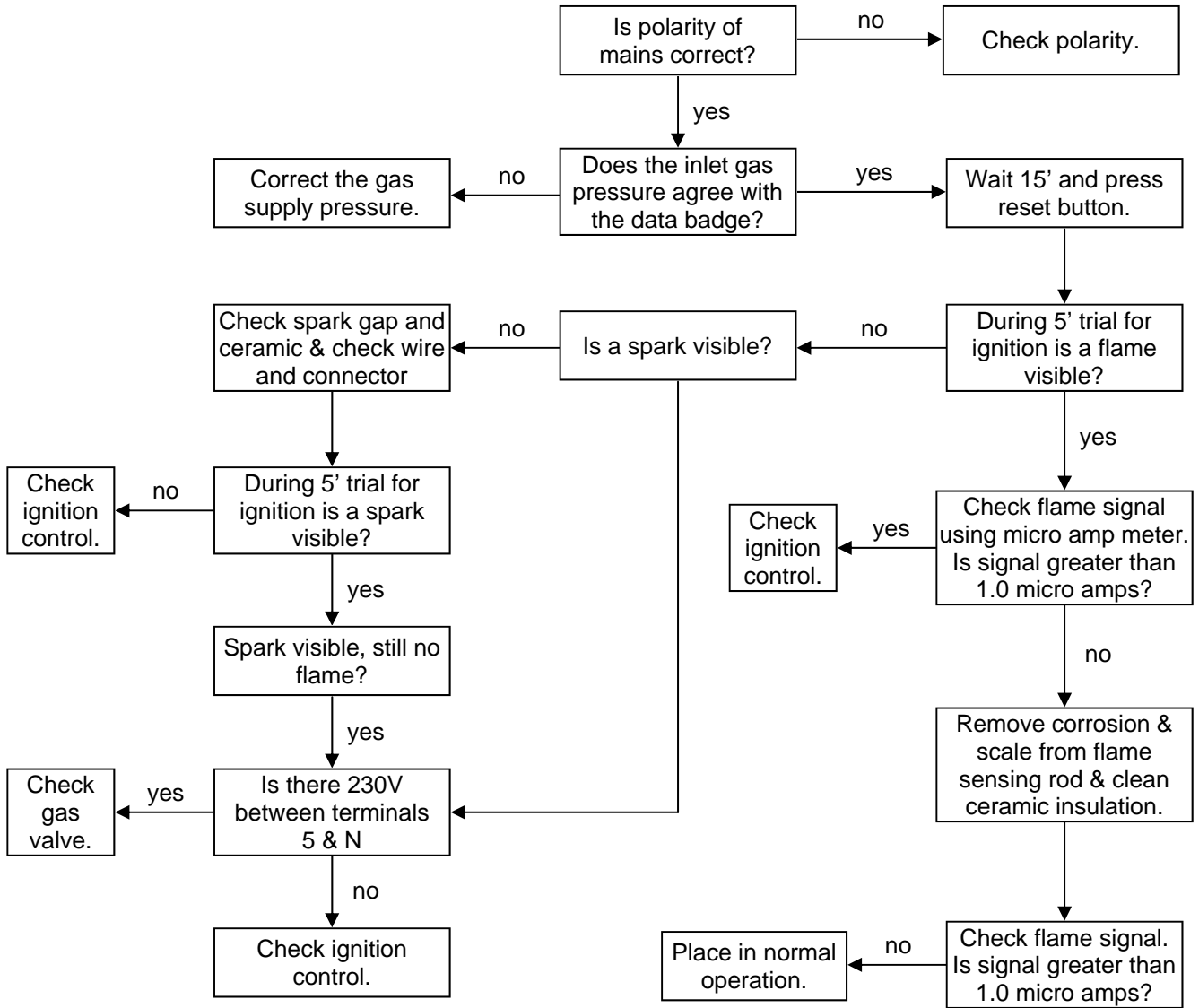
10.1 Main burner fault finding chart - Lockout indicator light is 'OFF', but air heater will not operate.

WARNING: Fault finding may only be carried out by appropriately qualified persons.



10.2 Burner ignition controller indicator light repeatedly comes 'ON'.

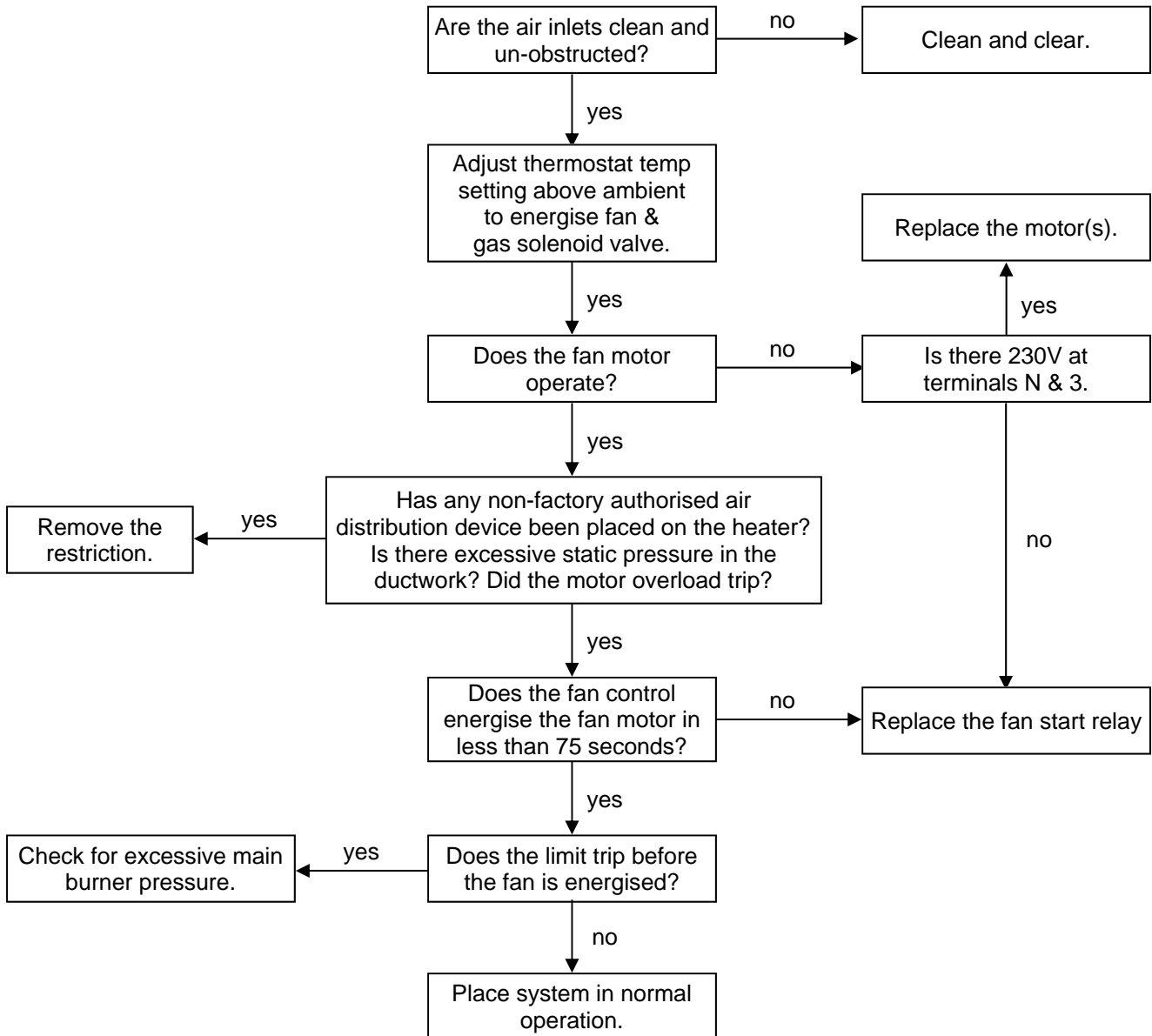
WARNING: Fault finding may only be carried out by appropriately qualified persons.



10.3 Burner limit control fault finding chart (limit control trips).

WARNING: Fault finding may only be carried out by appropriately qualified persons.

Note : Heaters are equipped with 2 limits (a recycling limit and a manual reset limit). During normal operation, neither limit should trip even if the main electric supply is interrupted during operation. In the event of motor failure, the recycling limit will trip opening the gas valve.



Appendices

1. An OEM set of burner instructions are included with this manual under a separate document.
2. A full set of wiring diagrams are included with this manual under a separate document.

11. User Instructions.

Display this near your heater. For safe and satisfactory operation, these instructions should be read and fully understood.

11.1 General

For continued safe and efficient operation, this heater should be serviced regularly by a competent service engineer. A full after sales service is available from Nordair Niche. Read the warranty and ensure that the heater is operated within the terms of the warranty. Maintain free access to the heater for servicing and do not restrict the air supply to the heater.

For your safety

- Ensure that the heater is properly earthed.
- If a gas leak is suspected, turn off the gas supply and contact the gas supplier immediately.
- **DO NOT USE A NAKED FLAME** to inspect gas leaks.

11.2 To turn the heater on

1. Turn 'ON' the gas supply and the electrical supply to the heater.
2. The time and temperature control if the heater is under the dictates of a time temperature controller and will start automatically.

Notes

- On initial start-up, several attempts may be required to purge the air from the multifunctional control valve.
- If the heater will not 'start' on initial start-up, the ignition controller may be in lockout position. Depress the reset button.

11.3 Normal operating sequence

1. On time signal start, main supply fan starts.
2. Room sensor calling for heat, flue venter commences a purge period followed by ignition of the main flame.
3. Below room set point, the burner will fire at maximum heat input, until room set point is achieved. Depending on the type of control fitted i.e. modulating, high/low or on/off, the heater input will be reduced accordingly.
4. Room temperature exceeding room set point will shut down the burner. Main supply fan will

continue to run.

5. On time schedule shutdown the burner and main fan is shut down. Outside of the time schedule frost protection will start the heater. If the room temperature falls below the frost set point.

Note

The fan will continue to operate until the heat exchanger has cooled down.

To shut down the heater for a short period - Override the time/temperature controller to 'off'. To reinstate the heater operation, override the controller to 'ON'.

To shut down the heater for an extended period - Override the time/temperature controller to 'OFF'. Isolate the gas and electrical supplies.

Operation note

If a momentary interruption to the gas occurs, the burner will automatically lockout. Burner lockout must be manually reset.

If the heater continues to lockout after 3 or 4 consecutive attempts at ignition, contact Nordair Niche Service Department or your own service company.

In the event of the heater going into an overheat condition, wait 30 seconds before resetting. If the heater continues to go to overheat after 3 or 4 consecutive attempts, contact Nordair Niche Service Department or your own service company.

11.4 Maintenance and service

To ensure safe and efficient operation, this heater should be serviced at least annually. It is strongly recommended that the installing heater engineer or Nordair Niche Service Division be contacted to provide the necessary service.

Retain on file a copy of the service instructions for this heater. Retain service record of annual maintenance.

To clean the appliance cabinet, wipe the surfaces with a damp cloth, containing a mild detergent.

An AmbiRad Group brand



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