

INDIRECT FIRED POWER VENTED AIR HEATERS 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.

1. General Information.

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.

Please read this document before commencing installation.

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

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

The installation must also be in accordance with relevant requirements of "The Gas safety" (Installation and use Regulations) and (Amendment regulation 1990) and the "Building" and "Electrical Regulation" (in GB and IEE Regulations). The requirements of the "Local Building Standards Office", the premises "Insurance" undertaking and the "Fire Office" must also be observed.

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 or jeopardise all warranties. Deviations should only be carried out after formal consent has been obtained from the manufacturer.

Ensure the environment in which the air heater will 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.

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 Indirect Gas Fired Heat Exchange modules. The modules are purpose designed to be incorporated into air heating appliances and the modules comply with CE directives.

This appliance is suitable for operation within a -10°C to +40°C temperature range.

2. Installation

Handling The Equipment

Units with Base Frame

IDF heaters supplied with base frames are, depending on size, supplied in a number of sections, namely the fan section. The heat exchanger section and mixing box section, each with a channel base frame, which incorporate cutouts suitable for lifting purposes.

Each heater should be positioned onto a prepared flat level concrete base with a minimum size to suit the footprint of the heater, and allow a minimum 500mm clearance on non-access sides and 2000 on the access side for removal of heat exchangers.

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.

The mating faces of each section, are fitted with a sealing tape, and predrilled for bolting the sections together. Each base frame also incorporates a lug at each corner to bolt the frames together, levelling screws ensure the heater is horizontal.

Units with Curb Cap

The unit should be lifted from the bottom base using the lifting points provided and in a manner that holds it level and keeps it from tipping, falling or twisting. If the unit is severely twisted in handling permanent damage may occur. It is the installers responsibility to ensure that the handling of equipment is suitable and safe.

All lifting operations must be carried out using local spreader bars of sufficient width to ensure that the lifting cables/slings etc, clear the sides of the unit and do not damage the casing.

Before placing the unit in position a foam sealant tape or two beads of sealant should be applied to the top surface of the roof curb, ensuring good butt joints at the corners. The unit must be sealed to the curb to prevent water leakage into the curb area due to blown rain and capillary action.

When installing external weatherproof appliances ensure that any part of the installation that may be installed outdoors will not jeopardise the integrity of the premises security.

Ensure that the structural elements which will be used to support the appliance are adequate to carry the weight of the appliance and its ancillary components i.e. the ductwork system.

The location where the air heater is to be installed, must provide sufficient space around the air heater for servicing and to allow the flue products to escape freely. A minimum distance of 1000mm must be maintained on the controls side of the appliance.

Ensure that the unit is installed in a level plain and that the surface onto which it is installed is vibration free.

The unit must be fastened securely to any support frame work.

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

Sling spreaders must be used to provide clearance between the appliance and the slings.

Duct Connections

Nordair Niche IDF heaters are designed to be used in conjunction with air intake and air distribution ducting. A positive seal must be made between ductwork and the connection onto the appliance. All ductwork must be supported independently and not supported off the heater casing.

Flexible duct connections to the appliance are not required as the fan outlet is fitted with a flexible connection and is isolated from the casing via anti-vibration mounts.

2. Installation (continued)

Care should be taken when designing ducting systems especially with regard to the selection of fittings which will be installed adjacent to the appliance, abrupt elbows fitted directly on to the appliance can cause turbulence and create uneven air flows across the heat exchanger, resulting in hot spots and nuisance shut down of the burner due to regional overheating in the vicinity of the limit stat protection devices. Unnecessary pressure loss and noise generation may also be caused by badly designed duct systems.

Ducting should be manufactured from materials suitable for the purpose also taking into account the integrity of the building security.

Externally routed ducting should be thermally insulated and protected with a waterproof membrane.

3. Flue system & combustion air supply

Flue systems must comply with national and local regulations.

The products combustion must be flued to the outdoor atmosphere.

Flues should incorporate a disconnect section adjacent to the appliance to facilitate removal of the venter assembly for service and replacement purposes. The flue system must be supported independently and not supported by the unit.

Type B Appliances

The air heater supplied is as a B type appliance i.e, air for combustion to be taken from within the space to be heated, then it must be ensured that an adequate air supply for combustion and ventilation is provided, in accordance with the regulations and rules in force, in accordance with BS 6230 1991.

BS 6230 1991 "Specification for Installation of Gas Fired Forced Convection Air Heaters for Commercial and Industrial space Heating (2nd family gases)" or BS 5440 "Installation of Flues and Ventilation for Gas Appliances of rated input not exceeding 60kW (1st, 2nd and 3rd family gases)".

A horizontal distance between air heater and flue terminal must not be in excess of 16meters. When calculating the total length, the following equivalent length data must be taken into account

1 elbow at 45 degrees = 1m

1 elbow at 90 degrees = 1.5m

On long flue runs where condensation may occur provision should be made to drain the condensation and prevent any condensation from entering the heat exchanger or venter fan.

If condensation is to be avoided, flues should not pass through cold areas or not be installed externally for any great distance.

When mechanical ventilation is used, it should be mechanically interlocked with either a mechanical or natural extraction system. Automatic means of control such as interlocks must be provided.

The function pressure relief of other ventilation systems in the zone where the air heater is installed must be taken into account. At no time should it be possible to create a negative pressure environment in the zone, this can lead to a hazardous situation whereby the air heater flue may act as a pressure relief.

The terminal of a vertical flue must extend at least 1m above a roof surface; flues must not be located where products of combustion might enter the building. Terminals must be fitted to all flue., Wall terminations below 1.8m, above ground level must be fitted with a terminal guard, giving a minimal 50mm clearance around the terminal and must not allow a ball of 16mm to pass through it.

A separate flue system should be taken from each heat exchanger module within the appliance.

Refer to appendix 1 for more information

4. Gas & electrical connections

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.

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

Electrical

The electrical installation may only be carried out by appropriately qualified persons observing the rules in force.

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 attached to this one, plus an additional copy attached to the unit.

The unit must be earthed.

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.

A separate lockable isolator for each air heater must be provided adjacent to the appliance and within the sight of any person working on the appliance. The isolator must have a contact separation of at least 3.0mm on all poles. The

isolator should be of the key operable type to prevent vandalism and to prevent switching by others thus placing anyone working on the appliance at a safety risk.

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.

Note When working on the appliance electricity to the appliance should not be switched OFF before the room thermostat has been switched OFF, the gas valve has closed and the air circulation fan has 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 (Table 1).

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).

NOTE Outdoor commissioning work on Nordair Niche appliances should not be undertaken during wet conditions, a second person should always be available to provide assistance in the event of an emergency.

Check to ensure:

- Earth continuity
- Resistance to earth
- Phase supply to correct terminals
- Current rating and circuit breaker value

4. Gas & electrical connections (continued)

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.

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 indicated in section 8.

It will be necessary to remove the access panels or open the hinged access door, which is key lock protected prior to accessing the drive system.

Before commencing work on the fan assembly:

- Set external controls to off or their lowest setting
- 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 adjustments 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 and external pressure ordered.

The ductwork system, grilles and dampers should be commissioned and balanced to meet the airflow and static pressure characteristics of the appliance.

After balancing ensure that the motor load rating is not exceeded.

If the external pressure is incorrect or changes have been made to the system and the amount of adjustment required cannot be obtained by balancing the system to achieve the motor load factors required, then it will be necessary to change a pulley or pulleys and possibly the drive belt(s).

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

After adjustment ensure that the motor load rating is not exceeded.

Be aware that clean or dirty filters will influence readings.

5. Commissioning & testing

The Nordair Niche IDF unit is fitted with Indirect Gas Fired Heat Exchanger(s) as detailed in the technical data sheet. The attached instructions (appendix 1) 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, a second person should always be available to provide assistance in the event of an emergency.

When heaters are used in conjunction with Smartcom control, ensure that the engineers settings in the Smartcom are set to suit the application and appropriate sensor. These settings are fully detailed in the Smartcom manual.

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

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 a suitable thermostat has been fitted.
- Avoid location in draughty areas or where it may be influenced by heat sources e.g, the sun, process plants, etc. The thermostat or temperature sensor should be mounted on a vibration free surface and mounted about 1.5 metres above floor level. Follow the thermostat manufacturers fitting instruction. The thermostat must be suitable for switching 230 volts.

Gas connection

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

Caution Never use a flame for checking gas soundness.

See Appendix 1 for commissioning the heat Exchangers.

Dampers

Installation

When connecting ductwork to dampers take care to ensure that damper casing is not twisted by ductwork and that fixings do not penetrate cog housing of the damper which will affect the damper mechanism. Ductwork must be independently supported and should not be left to hang from the damper. Sealing should be in the form of prestik or a neoprene strip.

Ensure actuator rotation is correct in relation to blade location to prevent breaking linkages.

Maintenance

At six month intervals disconnect the actuator and check for freedom of movement.

6. Air Filters

COSHH Regulations

The components of filters are inherently safe, but changing air filters could expose operators to a 'Nuisance Dust' hazard. We would recommend that filter changing be carried out by maintenance personnel wearing simple dust masks, eye protection, overalls or protective clothing and gloves. Dirty filters should be sealed into plastic bags for disposal.

Disposable filters

These are supplied in the forms of panel and bag filters and are fitted into steel channel runners. Filters are simply withdrawn through the access door by sliding the filter along the channel runner. Filters should generally be replaced when the pressure drop increases to 0.5"wg (125pa) above the initial level.

Washable panel filters

Generally as per disposable filters except when pressure drop indicates dirty filter conditions,

filters should be fully immersed in warm water to which a mild detergent has been added. Agitate the filter until clean, rinse and allow to dry before replacing.

High efficiency particle arrestor filters

This type of filter is generally fitted in a front withdrawal frame. Filters will be held into the frame by retaining bars which can be removed to allow access to replace filters.

Carbon filters

Carbon filters normally have an active life of about twelve months, or more. It is advisable to remove a sample from the pack to return to the manufacturer to determine the remaining working life, preferably after the first six months and subsequent six monthly intervals.

Note When replacing all filters ensure filter is facing correct direction as Indicated by an airflow arrow.

7. Routine maintenance schedule

	Monthly	3 Monthly	6 monthly	Annually
Fan shaft bearings		X		
Motors	X			
Belts & Pulleys	X			
Heat exchangers			X	
Dampers			X	
Panel & bag filters		X		
HEPA filters		X		
Carbon filters			X	
External surfaces				X

7. Routine maintenance schedule (continued)

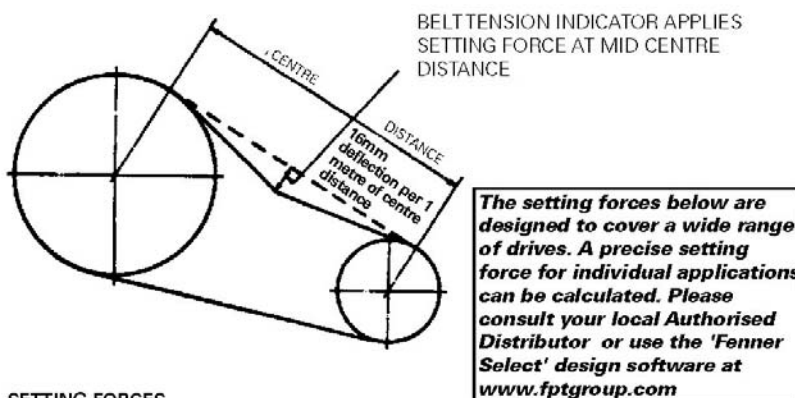
Invalidation of guarantee

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 name plate, 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.

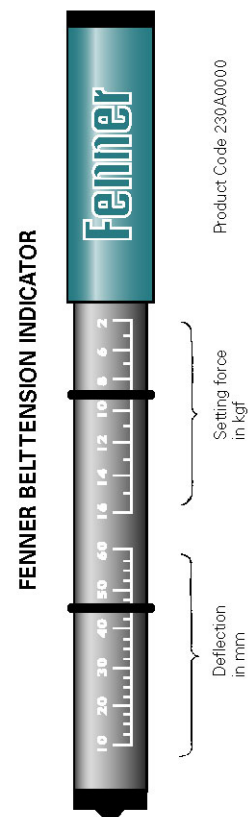
8. Belt tensioning

Belt tensioning procedure using a belt tension indicator



SETTING FORCES

Belt Section	Setting force to deflect belt 16 mm per metre of span				
	Small pulley diameter (mm)	Basic setting forces Newtons (N) kilograms (kgf)		1.25 x setting forces Newtons (N) kilograms (kgf)	
SPZ	56 to 71	16	1.6	20	2.0
	75 to 90	18	1.8	22	2.2
	95 to 125	20	2.0	25	2.5
XPZ & QXPZ	over 125	22	2.2	28	2.8
	80 to 100	22	2.2	28	2.8
SPA	106 to 140	30	3.0	38	3.9
	150 to 200	36	3.7	45	4.6
XPA & QXPA	over 200	40	4.0	50	5.1
	112 to 160	40	4.0	50	5.1
SPB	170 to 224	50	5.1	62	6.3
	236 to 355	62	6.3	77	7.9
XPB & QXPB	over 355	65	6.6	81	8.3
	224 to 250	70	7.1	87	8.9
SPC & QXPC	265 to 355	92	9.4	115	12.0
	over 375	115	12.0	144	15.0
8V	335 & above	150	15.0	190	19.0
Z	56 to 100	5 to 7.5	0.5 to 0.8		
A (& HA banded)	80 to 140	10 to 15	1.0 to 1.5		
B	125 to 200	20 to 30	2.0 to 3.1		
C	200 to 400	40 to 60	4.1 to 6.1		
D	355 to 600	70 to 105	7.1 to 10.7		



8. Belt tensioning (continued).

- 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, if necessary.

Appendix 4 - User Instructions

Display this near your heater

Important

For safe and satisfactory operation, these instructions should be read and fully understood.

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.

To turn the heater on

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

Note

- 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.
- After measuring the gas pressure, ensure the cap is refitted.

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 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.

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.

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



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 **NORDAIR**
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