

**INDIRECT FIRED POWER
VENTED CONDENSING 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.
- 3 Warning this appliance must be earthed.

Part No. 703025



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 Regulations (Installation and use), and Amendment regulation 1990. The Building and Electrical Regulations (in GB the IEE Regulations). The requirements of the Local Building Standards Office, the premises Insurance undertaking and the Fire Authority 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.

Modifications should only be carried out after formal consent has been obtained from the manufacturer.

Ensure the environment in which the air heater is 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 condensing heat exchanger modules. The

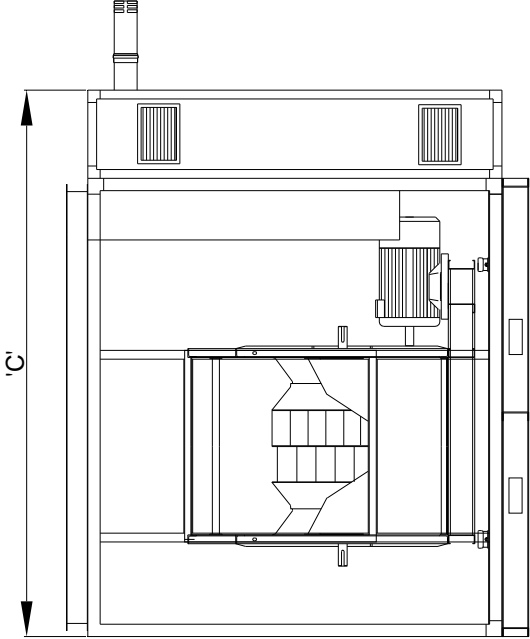
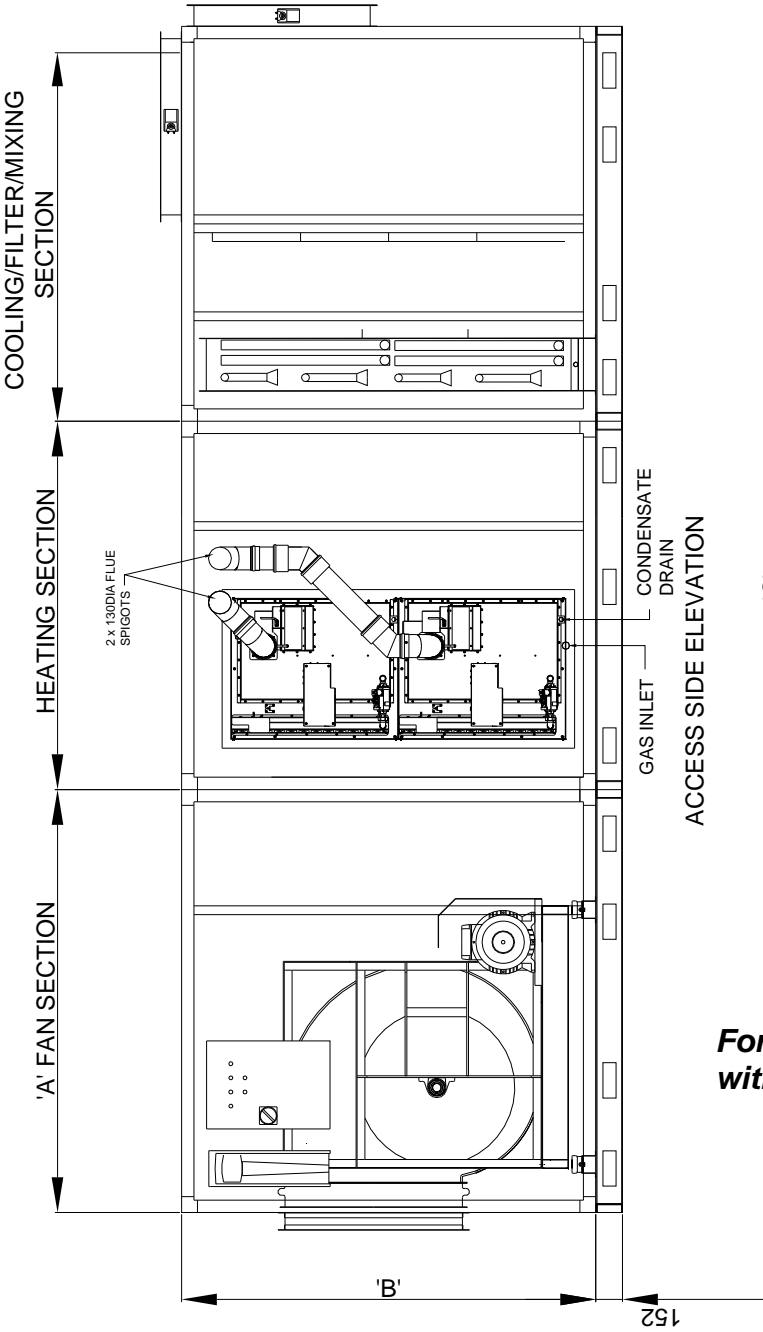
modules are designed to be incorporated into air heating appliances and comply with CE directives.

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

2. Technical Data.

Unit reference	kW Rating	Heater Bank 1 Condensing Single/Stacked	Heater Bank 2 Non- Condensing	Min Air Flow m ³ /sec	Max Air Flow m ³ /sec	Width (mm) 'C'	Height (mm) 'B'	Length (mm) 'A'	Fan Size
IDFE2	55	1 X RHCE8055		1.72	2	2500	1400	1330	355
IDFE3	55	1 X RHCE8055		2.1	3	2500	1400	1330	450
	80	1 X RHCE 8080		2.58					
IDFE4	55	1 X RHCE8055		3.1	4	2500	1400	1970	500
	80	1 X RHCE8080		3.1					
	110	1 X RHCE8110		3.44					
IDFE5	80	1 X RHCE8080		4.1	5	2500	1400	1970	500
	110	1 X RHCE8110		4.1					
IDFE7	110	1 X RHCE8110		5.1	7	2200	2200	2400	560
	135	1 X RHCE 8055 1 X RHCE 8080		5.1					
	160	2 X RHCE8080		5.6					
	190	1 X RHCE8080 1 X RHCE8110		6					
	220	2 X RHCE8110		6.88					
IDFE8	160	2 X RHCE8080		7.1	8	2200	2200	2400	630
	190	1 X RHCE8080 1 X RHCE8110							
	220	2 X RHCE8110							
IDFE9	160	2 X RHCE8080		8.1	9	2200	2200	2400	710
	190	1 X RHCE8080 1 X RHCE8110							
	220	2 X RHCE8110							
IDFE11	160	2 X RHCE8080		9.1	11	2600	2350	2400	800
	190	1 X RHCE8080 1 X RHCE8110							
	220	2 X RHCE8110							
IDFE14	220	2 X RHCE8110		11.1	14	3200	2600	2400	900
	345	2 X RHCE8110	1 X RHC8125						
IDFE16	220	2 X RHCE8110		14.1	16	3200	2600	2400	900
	345	2 X RHCE8110	1 X RHC8125						
IDFE18	345	2 X RHCE8110	1 X RHC8125	16.1	18	3600	2600	2400	1000

Overall Dimensions.



For dimensions, please refer to chart within section 2 - Technical Data

3. Installation

Handling The Equipment

Units with Base Frame

IDFE 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, incorporating cutouts 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 minimum clearances of 500mm on the non-access side, and 2000mm on the access side to allow 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 installation location 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 on a level plane 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 IDFE 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 from 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.

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

3. Installation cont.

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.

4. Flue system & Combustion Air Supply

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

Refer to appendices 1 & 2, where applicable, for more information.

Important:

The flue must be installed in accordance with national and local regulations. Failure to provide proper flueing could result in death, serious injury and/or property damage. The air heater must be installed with a flue to the outside of the building. Safe operation of any power vented gas apparatus requires a properly operating flue system, correct provision for combustion air and regular maintenance and inspection.

Model DJL heaters may be installed either as a Type B appliance, or as a Type C appliance. The flue must be in accordance with BS6230 or BS5440. Local requirements may apply in addition to national requirements. These unit heaters are designed to operate safely and efficiently with either a horizontal or vertical flue system, when installed following the specific requirements and instructions. If this heater is replacing an existing heater, be sure that the flue is sized properly for the heater being installed and that the existing flue is in good condition. A properly sized flue system is required for safe operation of the heater. An improperly sized flue system can cause unsafe conditions and/or create condensation.

The air heaters may be installed as a balanced flue (type C) appliance requiring both a combustion air inlet duct and a flue pipe, or as a power vented heater type B appliance (the combustion air is taken from the space where heater is installed), which requires only a flue pipe exhausting to outdoors. All products of combustion must be flued to outdoor atmosphere. Each heater installed as a type B appliance must be fitted with an individual flue pipe and the combustion air inlet opening must

be provided with a protection grille.

Each heater installed as a type C appliance must be fitted with an individual combustion air/flue pipe system. Type C2 appliances, with single duct system for supply of combustion air and evacuation of flue gases, are not allowed.

Important:

Condense drain.

A condense drain with trap must be fitted to the unit to properly drain all condensation. The flue must be installed in accordance with national and local regulations. Failure to provide proper flueing could result in death, serious injury and/or property damage. The air heater must be installed with a flue to the outside of the building. Safe operation of any power vented gas apparatus requires a properly operating flue system, correct provision for combustion air and regular maintenance and inspection. The combustion products are loaded with moisture, some of which will condense out within the flue. No condensate leakage is permitted. SHH Indoor horizontal flue runs must rise by 1° (17mm per meter) from the appliance to ensure that the condense returns to the flue drain.

Gasket sealed single wall seamless heavy gauge aluminium pipes are required for use with condensing gas appliances. All joints must be sealed to prevent leakage of flue gases or condensation into the building.

For testing, the flue pipe should include a sealable test point. Ideally the test point should be at least 450mm away from the air heater flue connection socket. However, if a concentric flue is attached directly to the connection sockets then the combustion should be tested through the flue outlet collar via a drilled test point which must be securely plugged on completion. Follow the flue manufacturers installation instructions for making joints, including connections to the air heater, for passing through a building element and for support requirements.

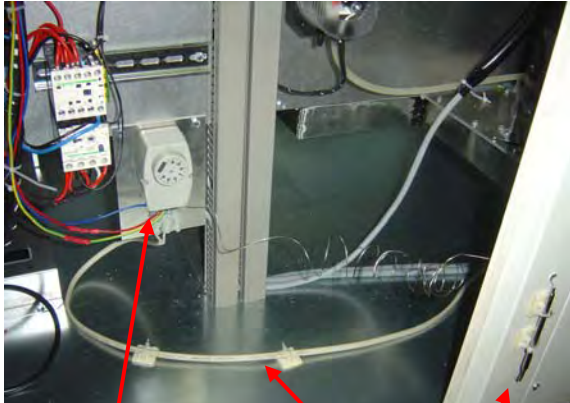
4. Flue System & Combustion Air Supply cont.

Note:

Models designed for outdoors must be equipped with a frost protection thermostat and electrical heating resistance to protect the condense drain system.

(Example of anti-frost thermostat and electrical heating: see figs. 4a thru 4e).

Fig. 4a

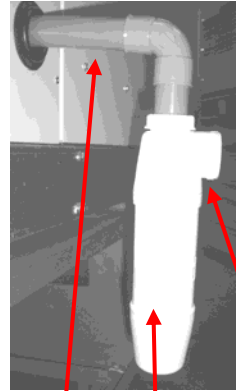


Frost thermostat
Inside unit
to be set at 3-5°C

Electrical heating
resistance

External sensor for
antifrost thermostat

Fig. 4d



32mm dia.
connection

Condensate trap
(option nr OP928)

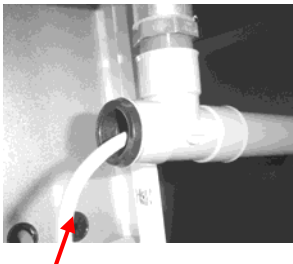
Fig. 4e



Sensor thermostat

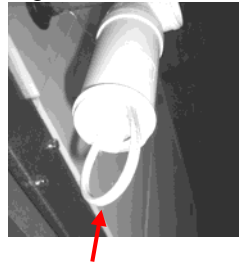
Connection for PVC
tube 40mm dia.

Fig. 4b



Electrical heating
resistance

Fig. 4c



Electrical heating
resistance
positioned inside condensate
trap

5. 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 nominal 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 information 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 or switching by others, thus

placing anyone working on the appliance in danger.

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 the 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.

A control panel may be supplied as part of the unit, refer to appendix 4.

The fan can be either direct on line, star delta or inverter controlled.

With inverter control air flows must not be reduced below the figures stated in section 2 (technical data).

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 overleaf 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

5. Gas & Electrical Connections cont.

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.

rating is not exceeded.

Be aware that clean or dirty filters will influence readings.

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.

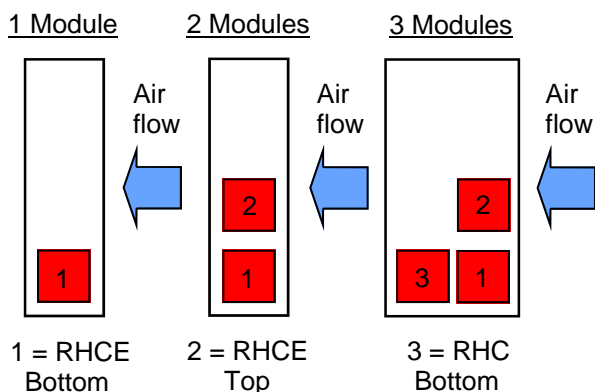
If the external pressure is incorrect or changes have been made to the system and the amount of adjustment required cannot be obtained by balancing the system to achieve the motor load factors required, then it will be necessary to change a pulley or pulleys and possibly the drive belt(s).

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

After adjustment ensure that the motor load

6. Commissioning & Testing

The Nordair Niche IDFE units are fitted with Indirect Gas Fired Heat Exchanger(s) modules as detailed in the technical data sheet.



The attached instructions (appendix 1 or 2) 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 no electrical wiring can touch the hot combustion collector box.
- Check that all wiring is connected in accordance with the appliance circuit diagram.
- 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 at about 1.5 metres above floor level. Follow the thermostat fitting instructions. The thermostat must be suitable for switching 230 volts AC.

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 naked flame for checking gas soundness.

See Appendix 1 or 2 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 affecting the damper mechanism. Ductwork must be independently supported and should not be supported from the damper. Sealing should be in the form of 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.

7. 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 suitable 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 form of panel or 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 for replacement.

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 filters are facing correct direction as indicated by the airflow arrows.

8. Routine Maintenance Schedule

	Monthly	3 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

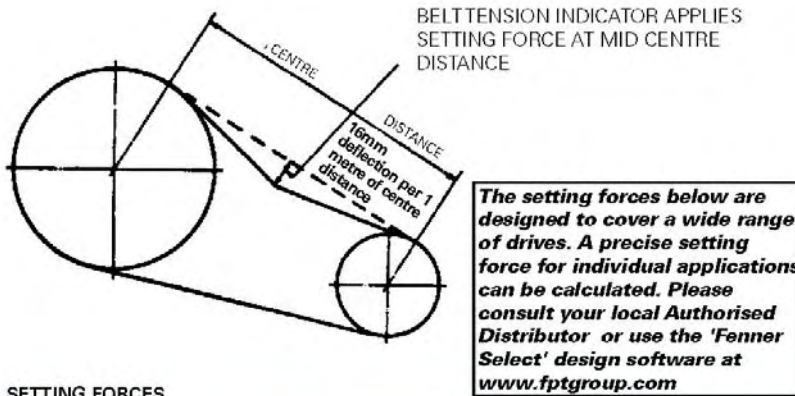
Invalidation of guarantee

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.

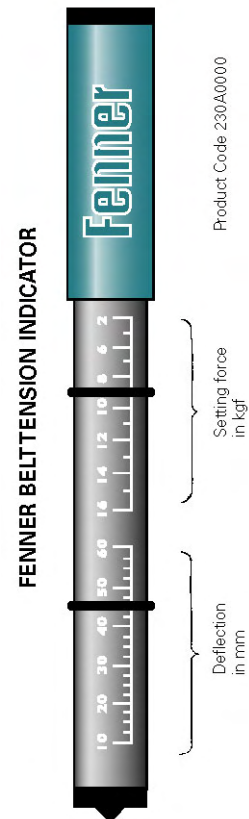
9. Belt Tensioning

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
SPA	80 to 100	22	2.2	28	2.8
	106 to 140	30	3.0	38	3.9
XPA & QXPA	150 to 200	36	3.7	45	4.6
	over 200	40	4.0	50	5.1
SPB	112 to 160	40	4.0	50	5.1
	170 to 224	50	5.1	62	6.3
XPB & QXPB	236 to 355	62	6.3	77	7.9
	over 355	65	6.6	81	8.3
SPC & QXPC	224 to 250	70	7.1	87	8.9
	265 to 355	92	9.4	115	12.0
SV	over 375	115	12.0	144	15.0
	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		



- 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 5. 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 for 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 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. When room sensor is 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 scheduled shutdown the burner and main fan are 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.

Notes.

AMBIRAD

HEATING AND VENTILATION SOLUTIONS

Technical Support:

Tel: **01384 489 200**

Fax: **01384 489 707**

ambiradgroupsupport@tnb.com
www.ambiradgroup.co.uk

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