REZNOR®

Revision: I-UDSBD-UK (02-19) PN 06 00116 UDSBD R2
Supersedes: 1801UDSBD-4E_GBEN

GAS-FIRED BALANCED FLUE/FAN-ASSISTED FLUE UNIT HEATER WITH CENTRIFUGAL FAN

UDSBD-4E

INSTALLATION
COMMISSIONING
SERVICING

CE

These appliances meet the following EC Directives
(EU) 2016/426: GAR
DIR 2014/30/EU:EMC
DIR 2014/35/EU:LVD
DIR 2006/42/EC:MD

Please read this document carefully before commencing installation, commissioning and/or servicing.
Leave it with the user or attached to the appliance or gas service meter after installation.

WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death. All work must be carried out by appropriately qualified persons.
The manufacturer does not take any responsibility in the event of non-observance of the regulations concerning the connection of the apparatus causing a dangerous operation possibly resulting in damage to the apparatus and/or environment in which the unit is installed.

Subject to modifications

NORTEK™
GLOBAL HVAC

INDEX

WARNINGS

Improper installation, adjustment, alteration, service, or maintenance can cause property damage, injury, or death. Read the installation, operation, and maintenance instructions thoroughly before installing or servicing this equipment.

Gas-fired appliances are not designed for use in hazourdous atmospheres containing flammable vapors or combustible dust, in atmospheres containing chlorinated or halogenated hydrocarbons or in applications with airborne silicone substances.

Should overheating occur, or the gas supply fail to shut off, shut off the manual gas valve to the appliance before shutting off the electrical supply.

Do not use this appliance if any part has been immersed in water. Immediately call a qualified service technician to inspect the appliance and replace any gas control that has been immersed in water.

This appliance is not intended for use by persons (including children) with reduced sensory or mental capabilities or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.

FOR YOUR SAFETY

What to do if you smell gas

- Do not try to light any appliance.
- Do not touch any electrical switch; do not use any phone in your building.
- Immediately call your gas supplier.
- Evacuate all personnel.
- Do not store or use petrol or other flammable vapours and liquids in the vicinity of this or any other appliance.

1 GENERAL

Models UDSBD-4E are design certified to the CE EN1020 standard for use in industrial and commercial installations only. All models and sizes are available for use with either natural or propane gas. The type of gas, the input rate and the electrical supply requirement is shown on the heater rating plate. Check the rating plate to determine if the heater is appropriate for the intended installation.

This installation manual is shipped with the heater. Verify that the literature is correct for the heater being installed. If the manual is incorrect for the heater, contact the supplier before beginning installation.

The instructions in this manual apply only to the models listed.

Installation should be done by a suitably qualified installer in accordance with these instructions. The installer is responsible for the safe installation of the heater.

2 INSTALLATION CODES

These units must be installed in accordance with BS6230 or BS5440 as appropriate plus all local building codes.

3 WARRANTY

Warranty is void if :

a. Wiring is not in accordance with the diagram furnished with the heater.
b. The unit is installed without proper clearances as soon as clearances are required regardless of the material being combustible.
c. A fan model is connected to a duct system or if the air delivery system is modified.

4 UNCRATING/PREPARATION

This unit was test operated and inspected at the factory prior to crating and was in proper operating condition. If the heater has incurred damage in shipment, document the damage with the transport company and contact your supplier.

Check the rating plate for the gas and electrical specifications of the heater to be sure that they are compatible with the gas and electric supplies at the installation site.

Read this booklet and become familiar with the installation requirements of your heater. If you do not have knowledge of local requirements, check with the gas supplier and any other local agencies who might have requirements concerning this installation.

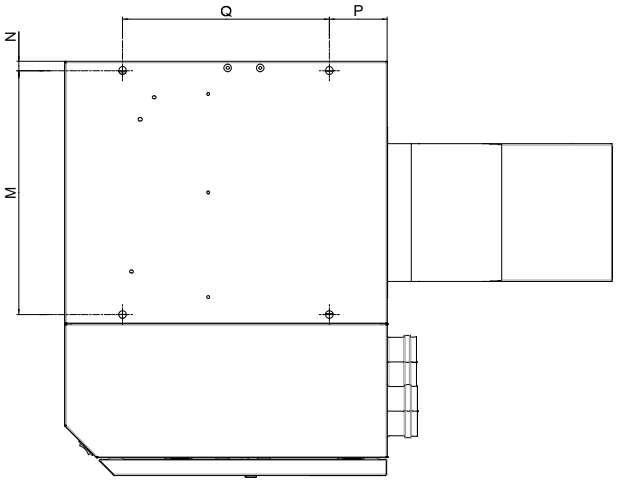
Before beginning, make preparations for necessary supplies, tools, and manpower. **If the installation includes optional vertical louvers or downturn nozzle etc., install these options before the heater is suspended. Follow the instructions included in the option package.**

5 DIMENSIONS/CLEARANCES

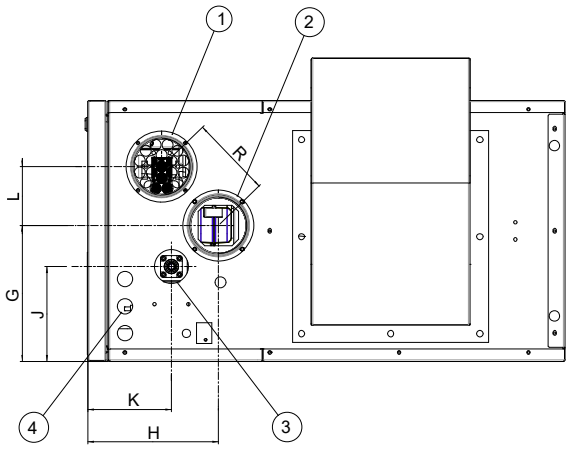
NOTE: For dimensions and clearances listed, horizontal orientation = standard.

Figure 1a : UDSBD 015-4E → UDSBD 020-4E2

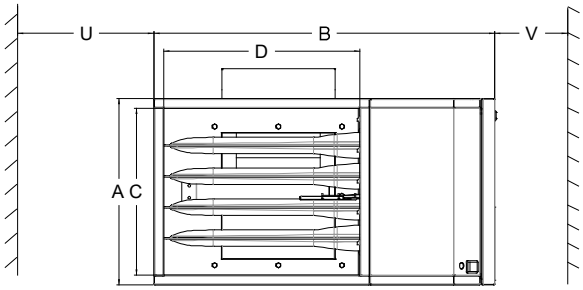
Top view



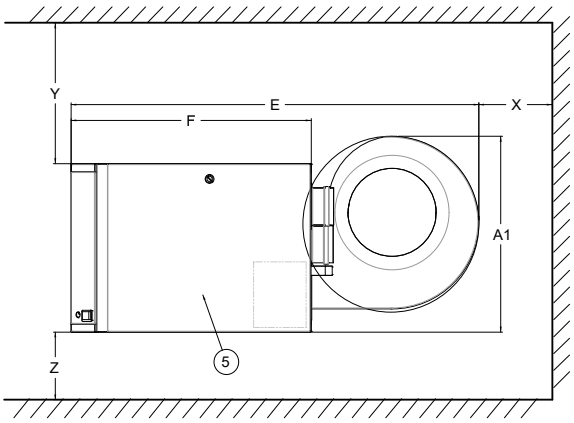
Rear view



Front view



Side view



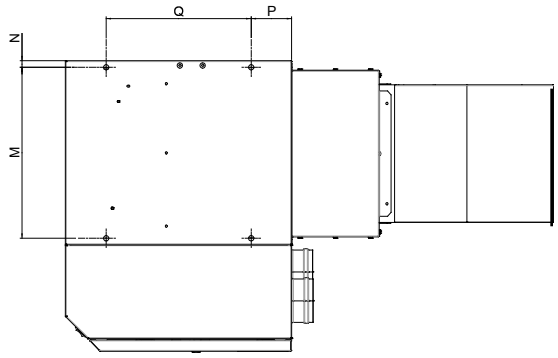
1. Combustion air inlet
2. Flue connection
3. External gas connection
4. Electrical connections
5. Service panel

Table 1a : Dimensions (mm)

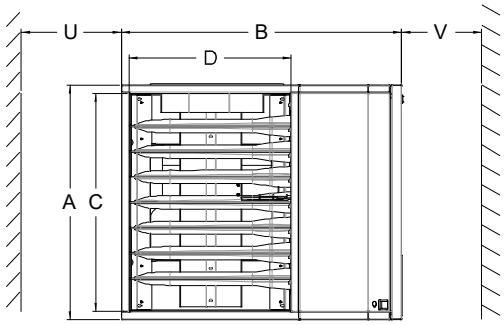
UDSBD-4E	A	A1	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R
015	383	460	700	343	404	935	546	199,5	191	139	122	86	413	15,5	98	350	120
020	383	460	700	343	404	935	546	199,5	191	139	122	86	413	15,5	98	350	120

Figure 1b : UDSBD 025-4E, 030-4E, 035-4E, 043-4E, 050-4E, 055-4E, and 064-4E

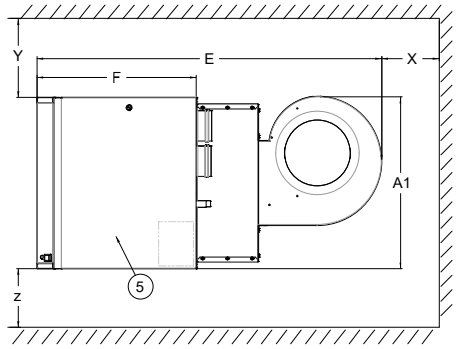
Top view



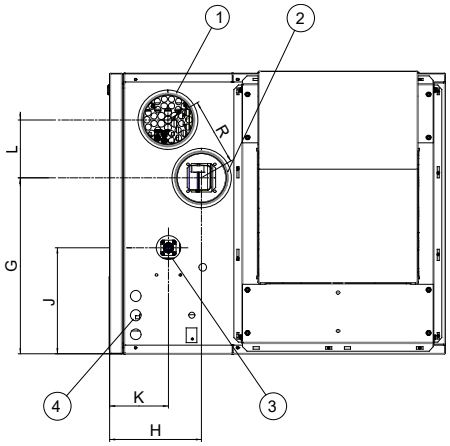
Front view



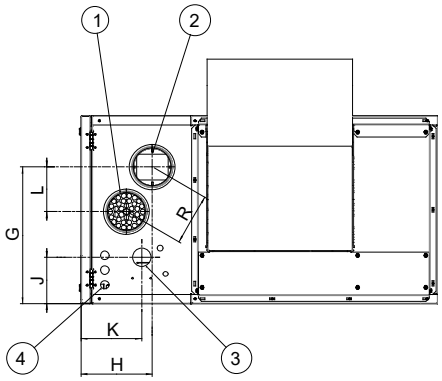
Side view



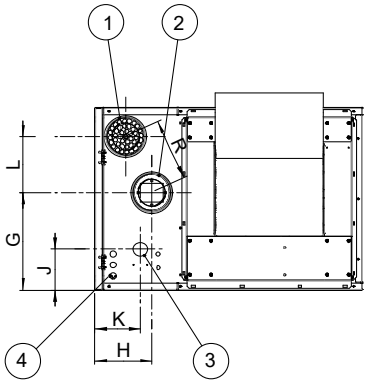
Rear view (models 025-4E and 030-4E)



Rear view (models 035-4E, 043-4E, and 050-4E2)



Rear view (models 055-4E and 064-4E)



1. Combustion air inlet
2. Flue connection
3. External gas connection
4. Electrical connections
5. Service panel

Table 1b : Dimensions (mm)

UDSBD-4E	A	A1	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R
025→030	586	590	700	546	404	1185	546	367,5	191	222	122	121	413	15,5	98	350	140
035→050	510	670	970	456	601	1610	897	371	194	126	165	121	623	33	148,5	600	140
055	663	685	970	609	601	1610	897	354	206	150	165	204	623	33	148,5	600	225
064	663	720	970	609	601	1610	897	354	206	150	165	204	623	33	148,5	600	225

Clearances (mm)

Units must be installed so that the minimum clearances in Table 2 are provided for combustion air space, inspection, and service and for proper spacing from combustible materials.

Table 2 : Clearances (mm)					
UDSBD-4E	**X**	**Y**	**Z (*)**	**U**	**V**
015 → 030	100	130	50	270	850
035 → 064	100	180	100	350	850

(*) : Heaters can be base mounted on suitable non combustible supports.

Attention :
The clearance distance from the flue system must be a minimum of 150 mm at all points !

Combustion air supply and flue system diameters

Table 3 : Flue system and gas connection diameters									
UDSBD-4E	**015**	**020**	**025**	**030**	**035**	**043**	**050**	**055**	**064**
Flue/air inlet (mm)	80	80	100	100	100	100	100	130	130
Gas connection (inches)	1/2	1/2	1/2	1/2	3/4	3/4	3/4	3/4	3/4

6 TECHNICAL DATA

Each blower motor is a three speed motor. The blower can be used on 3 different speeds. The units leaving the factory are set to the standard speed as mentioned in Table 4. The curves, as shown in the figures below, illustrate for each unit which speeds can be chosen in order to get another air duty. Speeds not illustrated in the curves mean that these are not applicable (means : unit should not be set to that speed).

To use the blower on a different speed, the electrical connection of the blower motor needs to be changed. This has to be done in the electrical connection box mounted on the blower itself. Inside the box, the 230V power supply wire is connected to the terminal of the standard speed. For changing speeds, you have to reconnect this wire to the terminal that corresponds to the desired speed (see wiring diagram inside service panel unit).

Table 4 : Technical data										
UDSBD-4E		**015**	**020**	**025**	**030**	**035**	**043**	**050**	**055**	**064**
Gas category		II_{2H3+}								
Comb. Air & Flue, type B installation[1]		B22								
Comb. Air & Flue, type C installation[1]		C12, C32, C42, C52, C62, C82								
Flue & combustion air connection collars	mm	80		100					130	
Heat input (Hs)	kW	17,6	22	30,8	35,2	42,2	50,8	58,6	66	77,7
Heat input (Hi)		15,9	19,8	27,8	31,7	38	45,8	52,8	59,5	70
Heat output		14,6	18,2	25,5	29,2	34,9	42,1	48,6	54,7	64,4
Thermal efficiency	%	92								
Gas consumption rate: natural gas G20	m^3/h	1,68	2,1	2,94	3,36	4,02	4,85	5,59	6,3	7,41
Gas consumption rate: propane G31	kg/h	1,24	1,55	2,16	2,47	2,96	3,57	4,12	4,64	5,46
Gas connection size (not supply line size)[2]	inches	1/2				3/4				
Temperature rise[3]	K	20	23	27	25		31	29	30	32
Airflow[3]	m^3/h	2150	2350	2750	3360	4080	3900	4900	5300	5930
Nominal motor speed	rpm	950		1430		950				
Standard low, mid or high speed		mid	high	low	mid	low		mid		high
Recommended mounting height[4]	m	3,5	4	4,5		5,5		6		
Horizontal air throw[5]		18	23	26		32	34	38		
Sound pressure[6]	dB(A)	50	52	47	51	46	47	52	50	53
Sound pressure[7]		57	58	54	58	53	54	59	57	60
Electrical service (protection class IP20)		230/240V 1N ~ 50 Hz								
Total electrical rating	W	496		1662		1700				

[1]Gas appliance classifications for approved venting methods based on CEN-report CR1749:2001.

[2] There is a difference between the gas connection diameter and the diameter of the supply line. Always use the most adequate diameter of the supply line to minimize the pressure drop through the gas pipes - if necessary, reduce the diameter of the supply line at the inlet of the unit.

[3]Figure for discharge louvre zero deflection.

[4]Height from floor to bottom surface of heater. These are recommendations only. Positioning of unit heaters for proper performance is application dependent. Operation is affected by other air moving equipment in the space, obstructions to the airflow, draughts and/or close proximity to doors or windows, etc ... Care should be taken to avoid mounting the heaters above these recommendations, unless downturn nozzle options are used, as significant stratification may occur resulting in poor floor coverage and higher energy losses through the roof structure.

[5]Isothermal conditions +/-20°C ambient air temperature, discharge louvres zero deflection, v = 0,5m/s. The air throw will be influenced by the height of the building, mounting height of the unit, ambient temperature & adjustment of the louvres.

[6]Sound pressure level in dB(A) in free field conditions, measured at 5 meters from the unit, free outlet.

[7]Sound pressure level in dB(A), measured at 5 meters from the unit with A=160m² & Q=2, free outlet.

Figure 2a : Blower curves for UDSBD 015-4E→UDSBD 020-4E

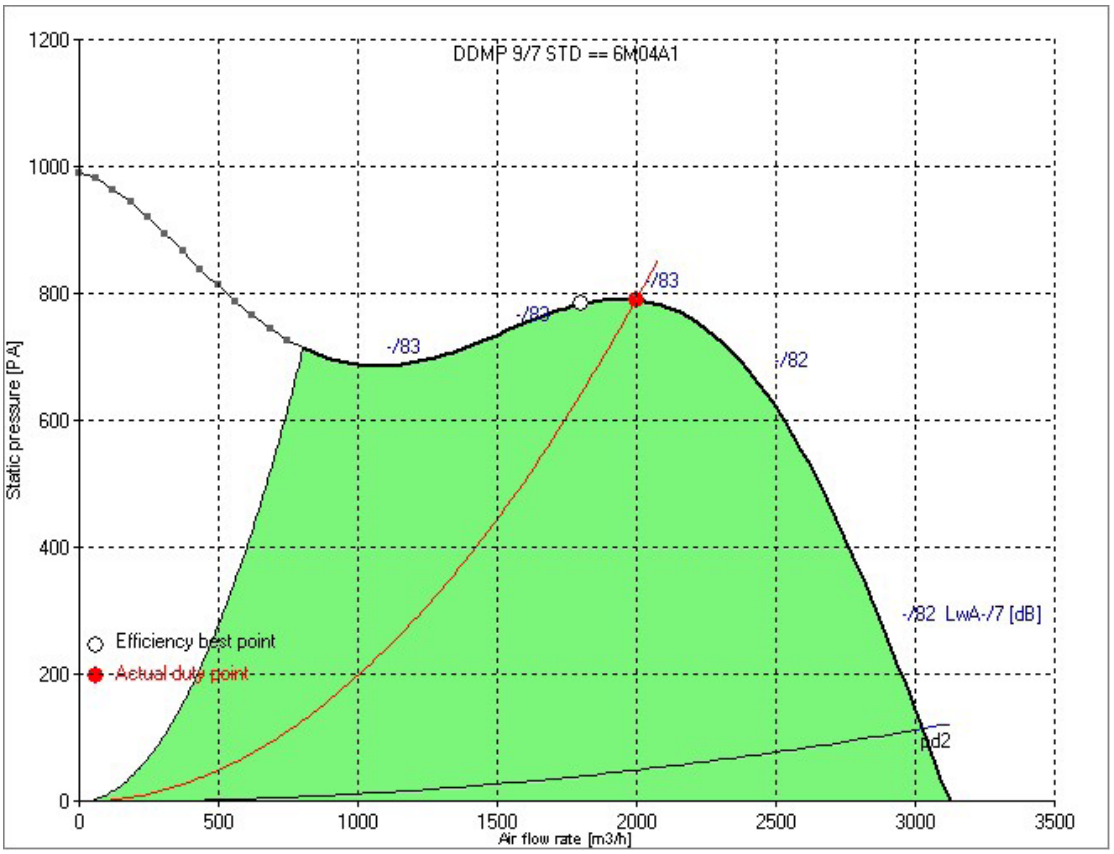


Figure 2b : Blower curves for UDSBD 025-4E→030-4E

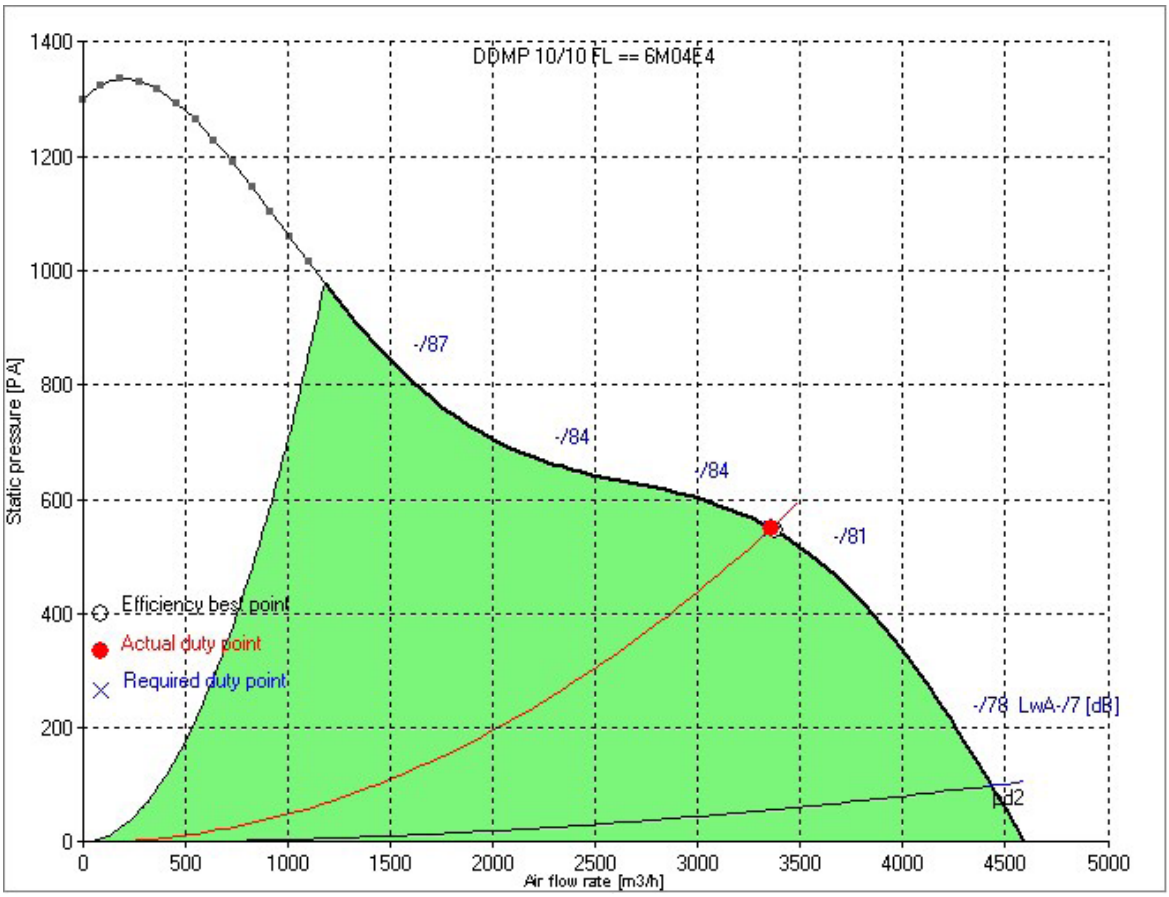


Figure 2c : Blower curves for UDSBD 035-4E

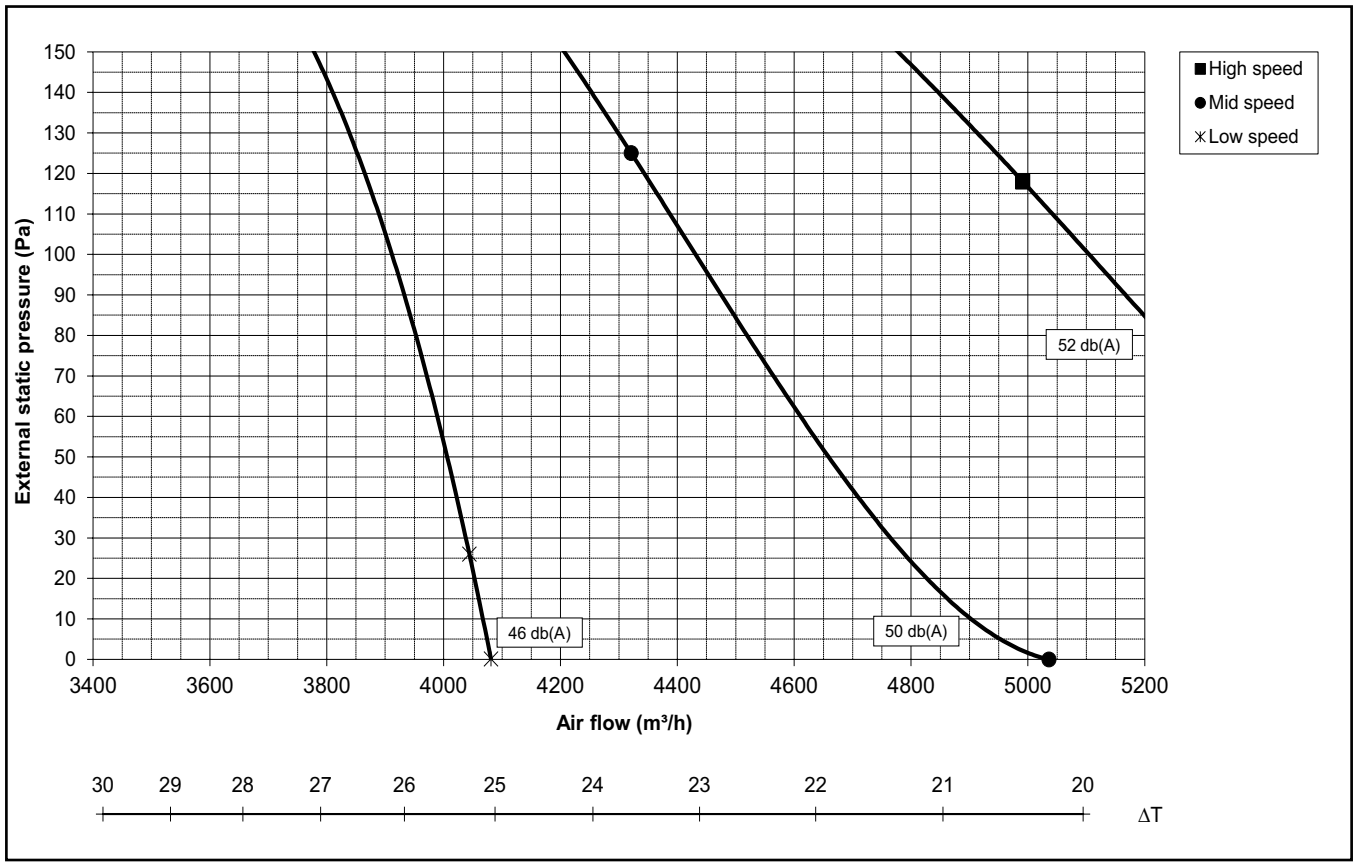


Figure 2d : Blower curves for UDSBD 043-4E

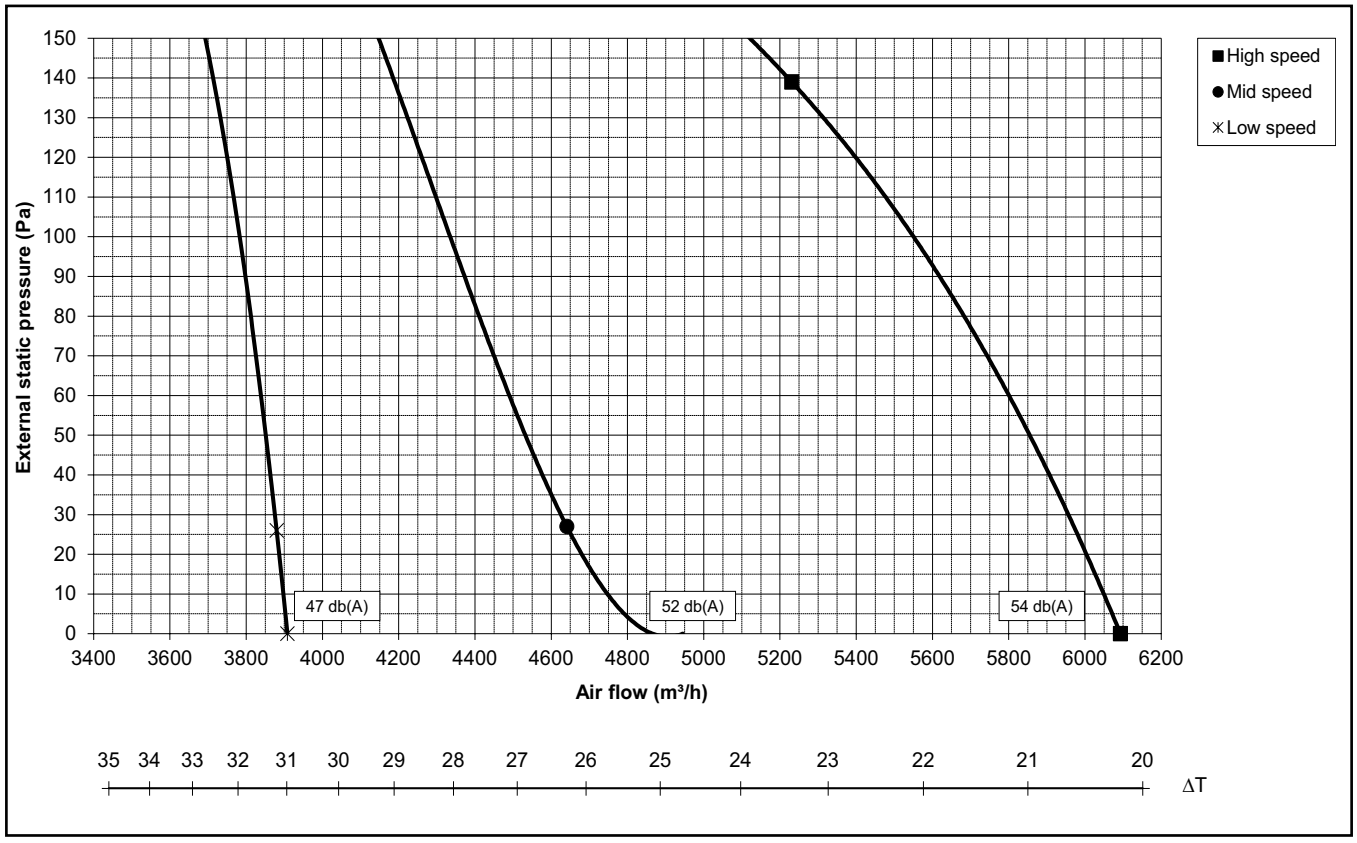


Figure 2e : Blower curves for UDSBD 050-4E

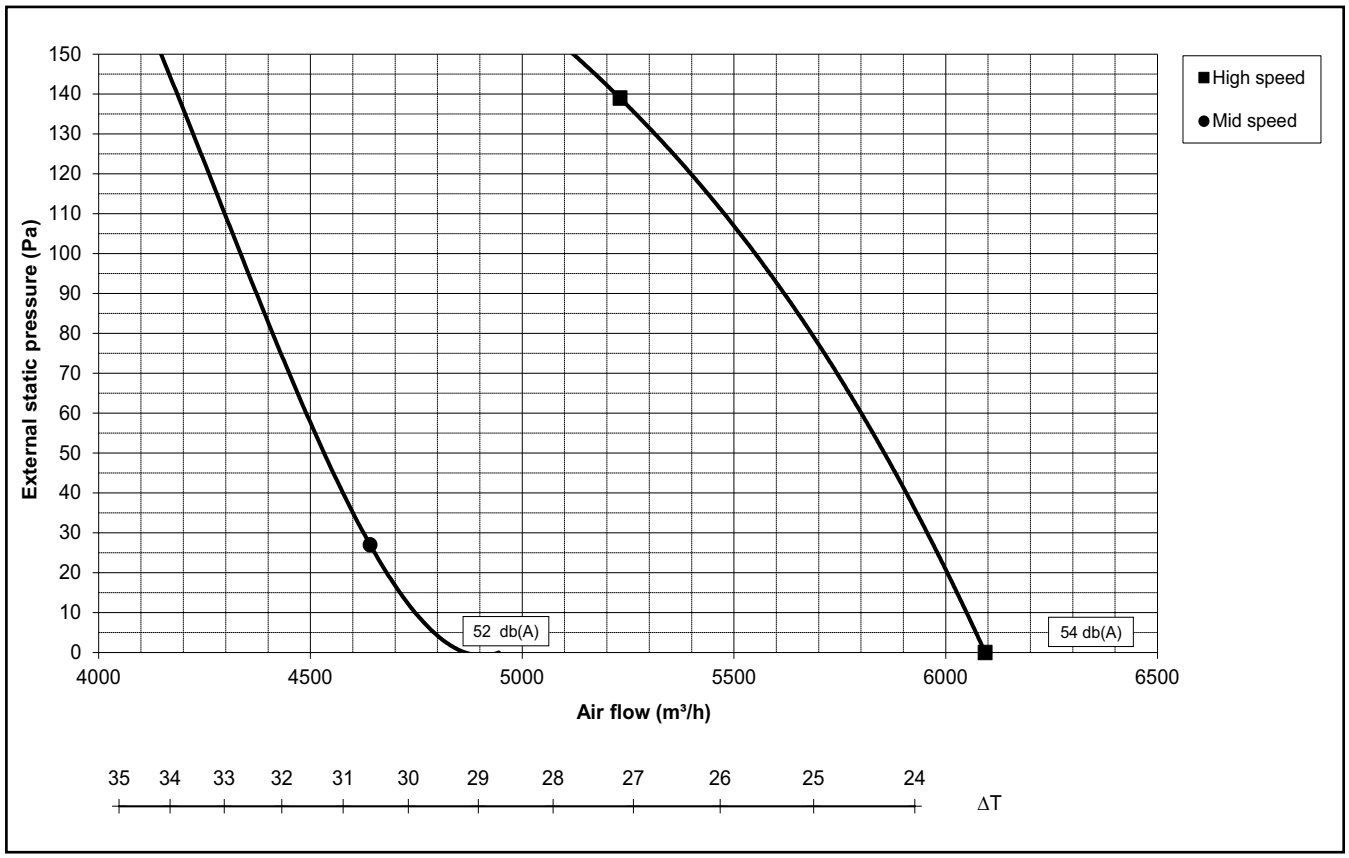


Figure 2f : Blower curves for UDSBD 055-4E

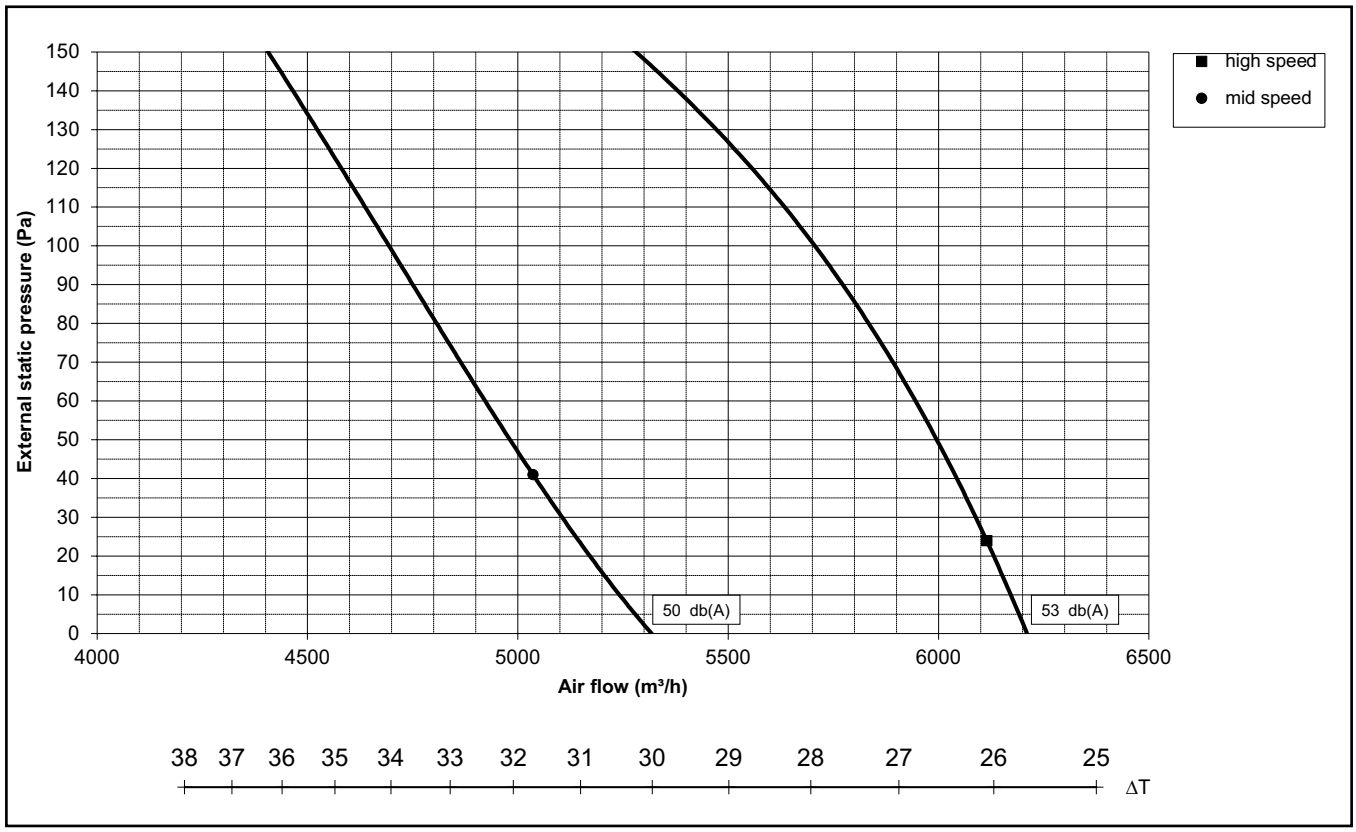
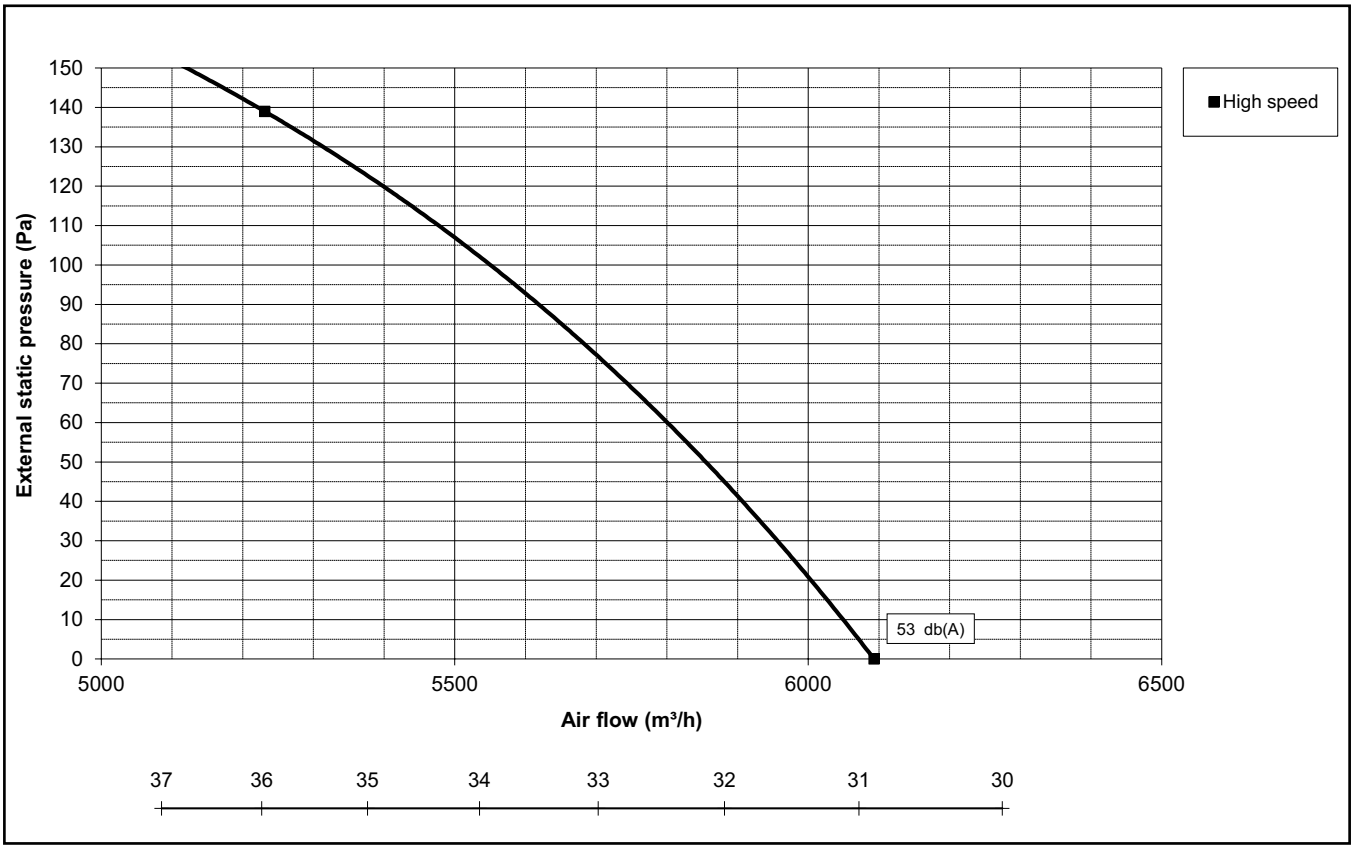


Figure 2g : Blower curves for UDSBD 064-4E



7 FLUE REQUIREMENTS

Model UDSBD-4E heaters may be installed as Type-B and Type-C installations.

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 with 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) heater requiring both a combustion air inlet duct and a flue pipe or as a power vented heater (type B) (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 is provided with a protection grill. Each heater installed as a type C appliance must be fitted with an individual combustion air/flue pipe system. Type C2 appliance, with single duct system for supply of combustion air and evacuation of flue gasses, are not allowed.

IMPORTANT :

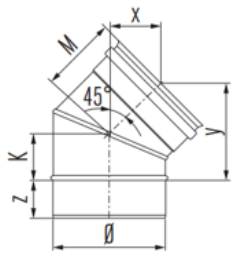
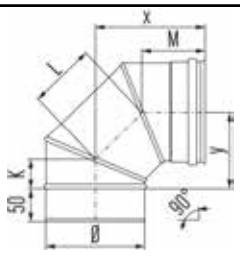
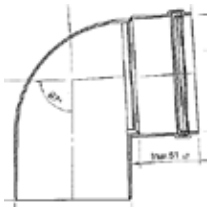
The flue must be installed in accordance with national and local regulations. Failure to provide proper flueing could result in death, serious injury and/or property damage. The air heater must be installed with a flue to the outside of the building. Safe operation of any power vented gas apparatus requires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

Diameter and maximum flue pipe lengths

Flue pipe diameters and maximum pipe lengths in Table 5 apply to both **horizontal** and **vertical** systems. Add **all** straight sections and equivalent lengths for elbow.

The total combined length **must not exceed** the maximum flue length.

Table 5 : Maximum flue system pipe lengths

UDSBD-4E				015-020	025→050	055→064
Heater socket & pipe dia		mm	Flue pipe/Inlet pipe	80	100	130
Max straight length		m	Flue pipe/Inlet pipe	9	9	9
Equivalent length of 45° elbow		m	Flue pipe/Inlet pipe	0,75	0,75	0,75
Equivalent length of 90° elbow		m	Flue pipe/Inlet pipe	1,5	1,5	1,5
Equivalent Length of 90°elbow		m	Flue pipe/Inlet pipe	1,5	1,5	1,5

- Use only one flue pipe diameter on an installation.
- Recommended minimum flue is 1m.

* Mentioned lengths only apply when : 1) no elbow installed immediately after flue and inlet or 2) successively installation of several elbows without straight pipe.

FLUE OUTLET

Venter outlet attachment requirements:

Depending on the size of flue pipe as determined in Table 5, attach either the flue pipe directly to the collar or a taper-type connector.

Attention :

Single wall flue pipe exposed to cold air or run through unheated areas should be insulated. Where condensation is unavoidable, provision must be made for the condensation to flow freely to a point to which it can be released, i.e. a drain or gully. The condensation drain from the flue must be constructed from non-corrodible material not less than 20 mm diameter. Copper or copper based alloys must not be used for condensation drains.

The port must be at least 450 mm away from the air heater flue connection socket. Follow the flue pipe manufacturers installation instructions for making joints, including connections to the air heater, for passing through a building element and for support requirements.

Single wall flue seamless aluminium or stainless steel pipes are required. All joints must be sealed to prevent products of combustion from leaking into the building. If the flue passes through a combustible element of the building it must be enclosed by a sleeve of non-combustible material and separated from the sleeve by a minimum of 25 mm air break. The temperature of any combustible material near to the flue must not exceed 65°C when the heater is in operation. The flue must be at least 150 mm away from any combustible material.

FLUES FOR POWER VENTED INSTALLATIONS (type B appliances)

If the air heater is to be installed as a type B appliance, air for combustion will be taken from within the space where the heater is installed. Ensure that an adequate air supply for combustion and ventilation is provided within the building in accordance with BS6230/BS5440 plus other relevant regulations and rules in force.

Figure 3a : Approved appliances type B

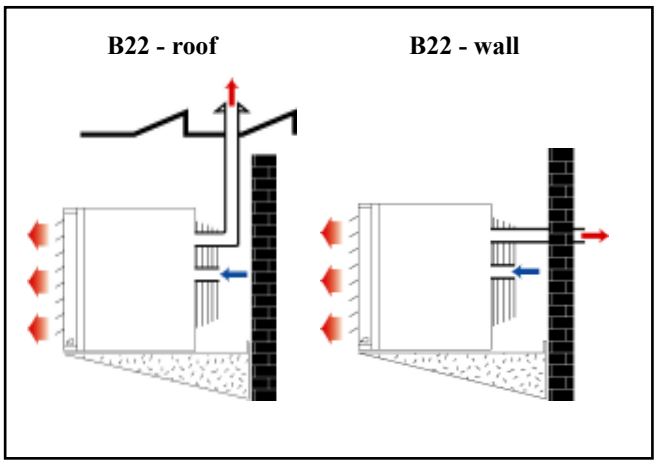
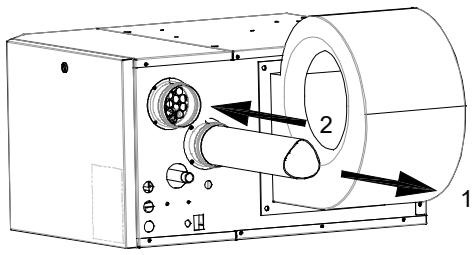
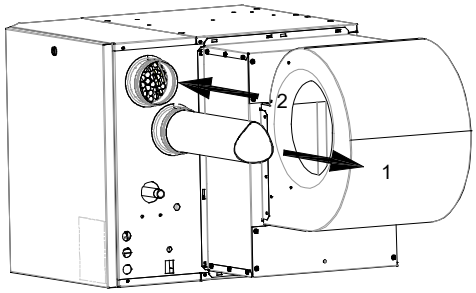


Figure 3b : Type B appliances : combustion air and flue pipe sockets

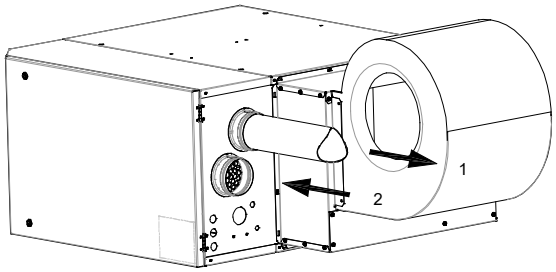
Models 015-4E and 020-4E



Models 025-4E, 030-4E, 055-4E, and 064-4E



Models 035-2, 043-2, and 050-2



1) Flue pipe outlet collar

2) Combustion air inlet opening

AIR SUPPLY

When these air heaters are installed in type B applications, designed to take air for combustion from the space in which it is installed. Do not restrict the combustion air intake.

It is important to ensure that there is an adequate air supply at all times for both combustion and heating requirements. Modern buildings involve greater use of insulation, improved vapour barriers, and weather proofing. These practices mean that buildings are sealed much tighter than in the past.

Proper combustion air supply for a power vented Type B installation requires ventilation of the heated space. Natural infiltration of air may not be adequate. Use of exhaust fans aggravates this situation. It is important to ensure that there is adequate combustion air supply at all times. Reliance on doors and windows is not allowed.

Always ensure that adequate combustion air is provided to suit the total installation of all combustion equipment in accordance with BS6230 or BS5440 as appropriate.

Ensure that the air combustion inlet opening at the rear side of the unit cannot be obstructed (see Figure 3a).

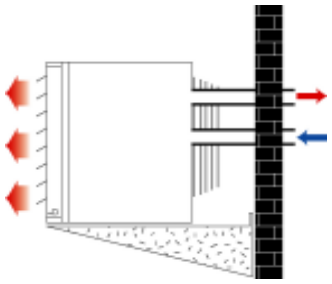
Combustion air inlet pipe & flue pipe for balanced flue installation (type C appliances)

Balanced flue air heaters are designed to be fitted with a combustion air inlet duct that obtains outdoor air and a flue pipe that exhausts flue products to outdoors. Both the flue and combustion air pipes must be sealed. Use gasket sealed seamless aluminium or stainless steel pipe or equivalent. For testing, the flue pipe should include a sealable test port.

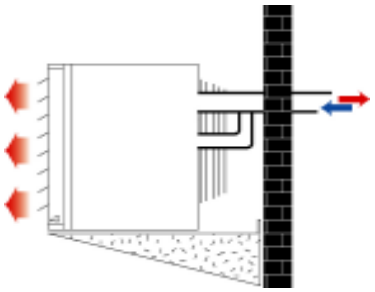
Type C2 appliances must not be applied !

Figure 4 : Approved appliances type C

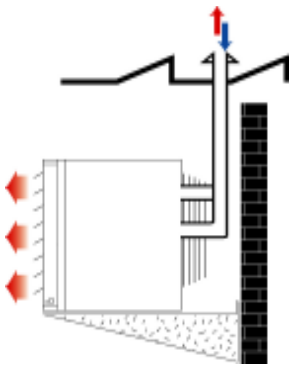
C12



C12b/C62



C32/C62



C52

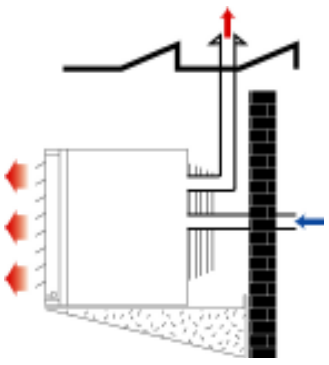
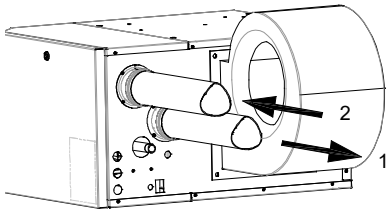
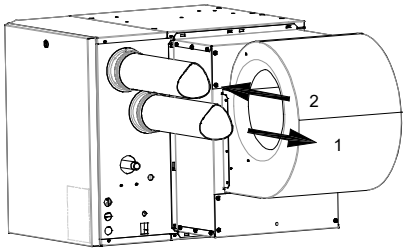


Figure 5 : Type C appliances : combustion air and flue pipe sockets

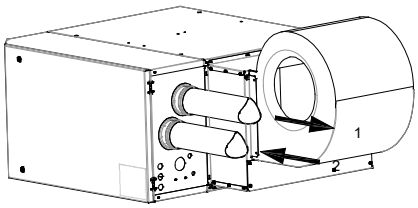
Models 015-4E and 020-4E



Models 025-4E, 030-4E, 055-4E, and 064-4E2



Models 035-4E, 043-4E, and 050-4E



1) Flue pipe outlet collar
2) Combustion air pipe inlet collar

8 HEATER LOCATION

Warning:
If touched, the vent pipe and internal heater surfaces that are accessible from outside the heater will cause burns. Suspend the heater such that these components cannot be touched.

Remark :

Flue requirements may affect location. Consult section 7 before making a final determination.

Use the minimum clearances in section 5 and the throw data in the technical data table of section 6 when determining where to suspend the heater.

For best results, the heater should be placed with certain rules in mind. Always ensure that minimum clearances are maintained. Locating a unit heater above the maximum recommended height can result in significant air stratification. When possible, heaters should be arranged to blow toward or along exposed wall surfaces.

Suspended heaters are most effective when located as close to the working zone as possible, but care should be exercised to avoid directing the discharged air directly on to room occupants.

Partitions, columns, counters, or other obstructions should be taken into consideration when locating the unit heater so that a minimum quantity of airflow will be deflected by such obstacles.

When units are located in the centre of the space to be heated, the air should be discharged toward the exposed walls. In large areas, units should be located to discharge air along exposed walls with extra units provided to discharge air in toward the centre of the area. For optimum results heaters are best used in conjunction with recirculating air fans suspended at high level.

At those points where infiltration of cold air is excessive, such as at entrance doors and shipping doors, it is desirable to locate the unit so that it will discharge directly toward the source of cold air, typically from a distance of 4.5 to 6.0 meters or install a downflow unit over the door opening.

Caution :
Do not locate the heater where it may be exposed to water.

Hazards of Chlorine - apply to the location of the combustion air inlet

The presence of chlorine vapours in the combustion air of gas-fired heating equipment presents a potential corrosion hazard. Chlorine, found usually in the form of Freon or degreaser compounds when exposed to a flame will precipitate from the compound, and go into solution with any condensation that is present in the heat exchanger or associated parts. The result is hydrochloric acid which readily attacks all metals. Care should be taken to separate these vapours from the combustion process. This may be done by wise location of the unit flue and combustion air terminals with regard to exhausters or prevailing wind directions. Chlorine is heavier than air. Keep this fact in mind when determining installation location of the heater in relation to building exhaust systems.

Where chlorine vapours are prevalent heaters with special grade 316 A1SI stainless steel heat exchangers are recommended.

9 HANGING THE HEATER

Warning:
Check the supporting structure to verify that it has sufficient load-carrying capacity to support the unit weight. Suspend the heater only from the threaded nut retainers or with a manufacturer provided kit. DO NOT suspend from the heater cabinet panels.
Do not place or add additional weight to the suspended heater.

Before suspending the heater, check the supporting structure to verify that it has sufficient load-carrying capacity to support the weight of the unit.

Table 6 : Weights

UDSBD-4E	Weight (kg)
015	50
020	53
025	71
030	74
035	125
043	131
050	131
055	148
064	153

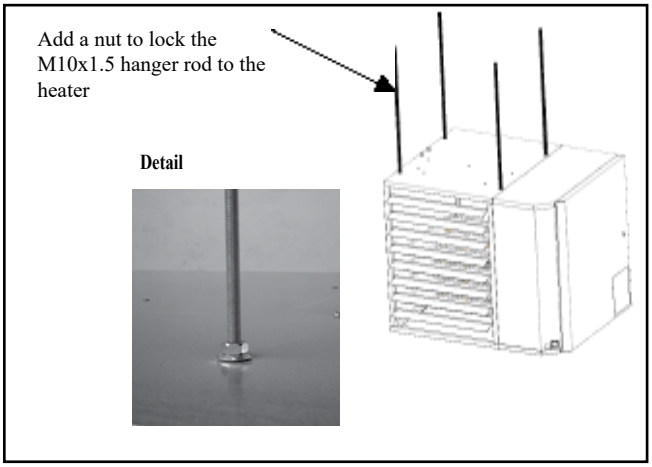
Leave the unit on the pallet. If the bottom of the unit is not supported or protected damage can occur.

The heater is supplied with four point suspension. All points must be used. Two threaded nut retainers are provided on each side of the top of the heater. See Figure 6 for hanger rod size.

Table 7 : Gas connection diameters

UDSBD-4E	Natural Gas/Propane (Inches)
015 → 030	1/2
035 → 064	3/4

Figure 6 : Suspending the heater with rods from the threaded nut retainers



Be sure that the threaded hanger rods are locked to the heater as illustrated in Figure 6. Recommended maximum hanger rod length is 1.8m. Where longer drops are required, ensure that restraints are fitted to prevent excess lateral movement and supports are adequately sized.

10 GAS PIPING AND PRESSURES

All piping must be in accordance with requirements outlined in the National Gas Codes (different for each country). Gas supply piping installation should also conform with good practice and any local codes. Support gas piping with pipe hangers, metal strapping, or other suitable material. **Do not rely on the heater to support the gas pipe.**

All sealing products shall be resistant to the action of liquefied petroleum gas or any other chemical constituents of the gas being supplied.

Install a ground joint union and manual shutoff the gas cock upstream of the unit control system.

The unit is equipped with a nipple that extends outside the cabinet. The gas connection is 1/2” or 3/4”, dependent on the size of the unit.

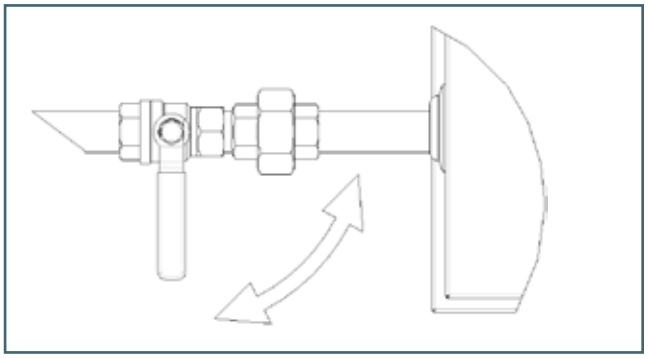
Leak test all connections by brushing on a leak detecting solution.

Warning:
All components of a gas supply system must be leak tested prior to placing equipment in service. NEVER TEST FOR LEAKS WITH AN OPEN FLAME. Failure to comply could result in personal injury, property damage or death.

This appliance is equipped for a maximum gas supply pressure of 50 mbar.

Pressure testing supply piping
Test pressures above 50 mbar : Disconnect the heater and manual valve from the gas supply line which is to be tested. Cap or plug the supply line.
Test pressures below 50 mbar : Before testing, close the manual valve on the heater.

Figure 7 : Gas connection



11 ELECTRICAL CONNECTION

DANGER : THIS APPLIANCE MUST BE EARTHED.

The electrical installation may only be carried out by an appropriately qualified person current to IEE Regulations. The supply line to the heater should include a main switch. The minimum **clearance** distance between the contacts must be more than 3 mm.
All electrical connections should be made in the heater control compartment. Screw type terminals are provided. Connections should be in accordance with the terminal markings and the wiring diagram affixed to the air heater.

Attention :
Serious damage can occur to burner relay when faulty connection of thermostat, reset switch or burner failure lamp.
Switching of wires for reset switch and flame failure (e.g. in a remote control box) will destroy the burner relay.

The minimum external control required for the air heater is a room thermostat. **It is essential that the main input line and neutral to terminals L and N remain live at all times even when the heater is switched off to ensure correct operation of the unit.**

A polarisation switch with green indicator light is fitted inside the heater to check if Line, Neutral and Earth are connected correctly. If this is the case, the green light will glow when pushing on the switch. If the light does not glow, check earth, line and neutral connections.

A burner reset switch with red indicator light is fitted on the heater. To add a remote reset button, make connections to the terminals in the electric box as indicated on the wiring diagram.

IMPORTANT:
If the reset button requires activating for any reason, the cause must be determined. After determining and correcting the problem, restart the heater and monitor long enough to ensure proper operation (approximately 5 minutes).

An orange indicator light is fitted on the heater to signify when the burner is on.

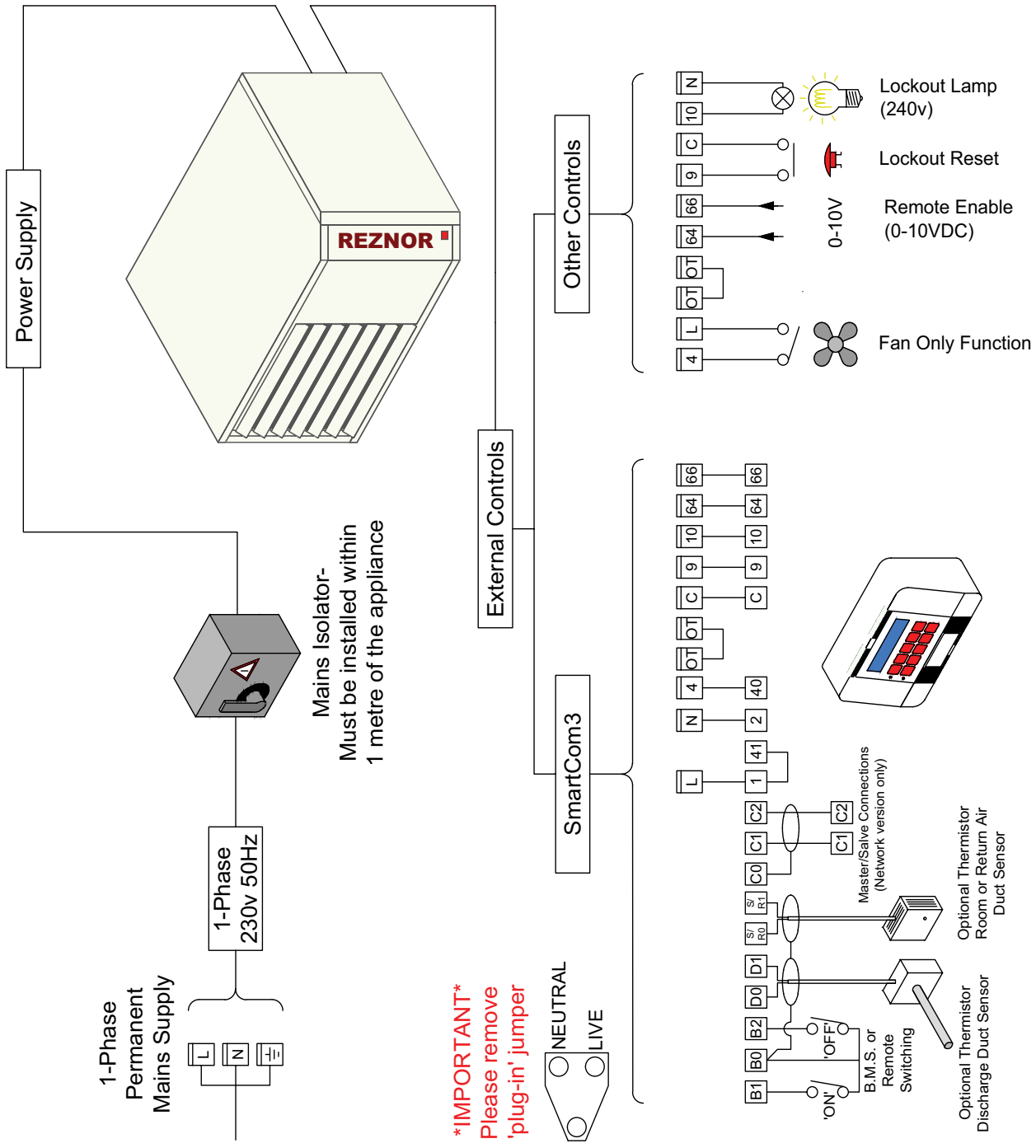
Ensure that all cables and installers wiring are fixed to the gas pipe and that they do not touch the combustion collector box.

THERMOSTAT LOCATION

Do not attempt to control more than one air heater from a single thermostat or control panel unless a properly wired relay is fitted. Follow the instructions supplied with such panels.

The location of the room thermostat or sensor is very important. It should not be positioned on a cold wall or cold surface. Avoid location in draughty areas or where it may be influenced by heat sources e.g. the sun, process plant, etc. The thermostat should be mounted on a vibration free surface and mounted about 1,5 metres above floor level. Follow the thermostat manufacturers instructions. The thermostat must be suitable for potential free contacts.

Figure 8 : Wiring connections on the terminal board



Heater Specification:
UDSA V4 - E Series
Modulating Burner Control (Brahma TC340A)

Legend:

- Heater Terminals
- Controls Terminals

Notes:

1. Link wires MUST be fitted where shown solid.
2. Terminals shown may not be in numerical order. Unused terminals may not be shown at all.
3. 1-Phase supply cable 2.5mm² minimum.
4. Controls cables 0.75mm² for up to 200 metre run.
5. SmartCom sensor & remote 'on' use 6A screened mains cable up to 100 metre run.
6. SmartCom master-slave network communication by screened twisted pair cable. (e.g. Belden 9841) Connect screen to terminal C0.
7. Fuse rating must be sufficiently sized to handle heater & motor loadings.

12 STARTUP

Check the installation prior to startup

- Check suspension. Unit must be secure. Verify that no other parts are fitted which are not individually supported and secured.
- Check clearances from combustibles. Requirements are in section 5.
- Check vent system to be sure that it is installed according to the instructions in section 7, venting requirements.
- Check piping for leaks and proper gas line pressure. Bleed gas lines of trapped air.
- Check electrical wiring and ensure that wiring conforms with the wiring diagram. Be sure all wire sizes meet requirements.
- Check polarity. Verify that line voltage exists between the black “L1” and earth ground.
- Verify that the appliance is earthed by conducting an earth continuity test.

Heater startup

Warning:

For your safety, follow the instructions exactly otherwise damage or injury could occur.

- This heater does not have a pilot flame. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.
- Before operating, smell all around the heater area for gas. Be sure to smell next to the floor because propane gas is heavier than air and will settle near the floor.
- Do not use this appliance if any part has subjected to water ingress. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control.
- When overheating occurs or when gas supply is not turned off, shut the manual gas tap before turning off the electric power.

Operating instructions and operating sequence

1. Set thermostat to the lowest setting.
2. Turn off all electric power to the heater.
3. Shut the gas cock at the inlet of the unit.
4. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you smell gas, STOP! and follow the steps in the WARNINGS printed on page 3. If you do not smell gas, proceed to the next step.
5. Turn on the electric power to the heater.
6. Open the gas cock at the inlet of the unit.
7. If fitted, ensure that a time switch is set to an ‘ON’ period.
8. Adjust the thermostat to the required setting (must be above current room temperature).

If the appliance does not operate, refer to and follow the instructions in TO TURN OFF GAS SUPPLY AT THE APPLIANCE below and call your service technician.

9. Thermostat calls for heat, energizing the venter motor.
10. When adequate air flow for combustion is proven by an air proving switch and a prepurge period has elapsed, the integral ignitor and multifunctional gas control operate. The ignition spark ignites the gas creating the burner flame.
11. Burner flame is sensed by a flame rod sensor and when the heat exchanger is warmed up (+/- 30 seconds) and the fan control relay closes, the fan motor is energized.
12. If the flame is extinguished during the main burner operation, the integrated control system closes the main valve and attempts to relight the burner. The unit will attempt 5 ignitions before entering a “lock out” mode. Lock out is indicated by the red warning light on the heater. To end this mode push on the reset switch.
13. To turn the heater ‘OFF’ for short periods : adjust the room thermostat to its lowest setting or ‘OFF’. The fan will continue to run to cool the heater and then switch off automatically.
14. To turn the heater ‘OFF’ for long periods : see ‘To turn off gas supply at the appliance’ below.

Check installation after startup

TO TURN OFF GAS SUPPLY AT THE APPLIANCE

1) Set thermostat to the lowest possible setting or ‘OFF’ position.
2) Shut off the gas tap when the fan has stopped.
3) Switch off electric power to the appliance.

- Check gas pressure as described in detail below.
- Turn the unit off and on, pausing 2 minutes between each cycle. Observe for smooth ignition.
- Set the thermostat to the required room temperature.
- Place this booklet and any control or optional information in an accessible location near the heater or give this information to the end user.

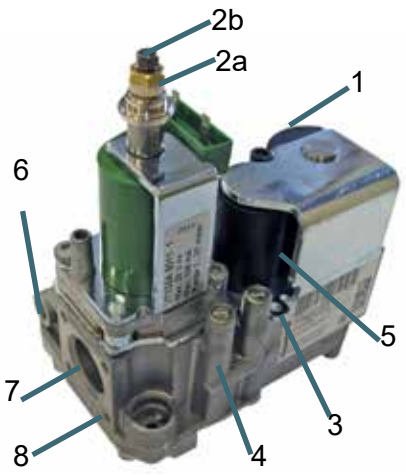
Burner gas pressure adjustment

The gas pressure is set for the required heat input before the appliance leaves the factory. Provided that the gas supply to the air heater is in accordance with the supply pressure described on the appliance data plate, the operating pressure will not require adjustment. To check the pressure use the following procedure:

* Ascertain from the heater's data plate the correct operating gas pressure
* Turn the room thermostat control to its lowest setting
* Remove the screw from the burner pressure test point of the multi-functional control valve. Connect a manometer to the test point (see Figures 9 and 10)
* Adjust the room thermostat to call for heat i.e. above room ambient temperature
* Observe the burner gas pressure on the manometer and compare to the required pressure on the data plate
* If necessary, adjust the burner gas pressure. Remove the cover screw (models 035-4E->100-4E) or cover cap (models 011-4E->030-4E). To adjust low fire, use the lower copper ring - to adjust high fire, use the upper plastic ring
* Set room thermostat to lowest setting to turn OFF the burners. Replace the test point screw/cap and with the main burner OFF, test for gas soundness using a leak detector fluid

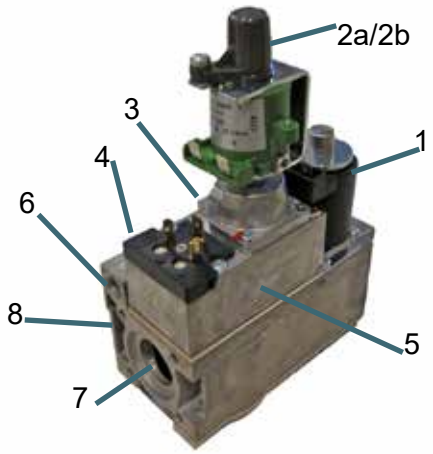
Reset temperature control/room thermostat to comfort operating level.

Figure 9 : Gas valve types (015-4E -> 043-4E)



Legend:
1) Shut-off solenoid valve EV1
2a) Adjustment low fire
2b) Adjustment high fire
3) Inlet pressure test point
4) Outlet pressure test point
5) Shut-off solenoid valve EV2
6) Pilot outlet
7) Main gas outlet
8) Holes (M5) for fixing flanges

Figure 10 : Gas valve types (050-4E -> 064-4E)



Legend:
1) Shut-off solenoid valve EV1
2a) Adjustment low fire
2b) Adjustment high fire
3) Inlet pressure test point (not visible on Figure 10)
4) Outlet pressure test point (not visible on Figure 10)
5) Shut-off solenoid valve EV2
6) Pilot outlet
7) Main gas outlet
8) Holes (M5) for fixing flanges

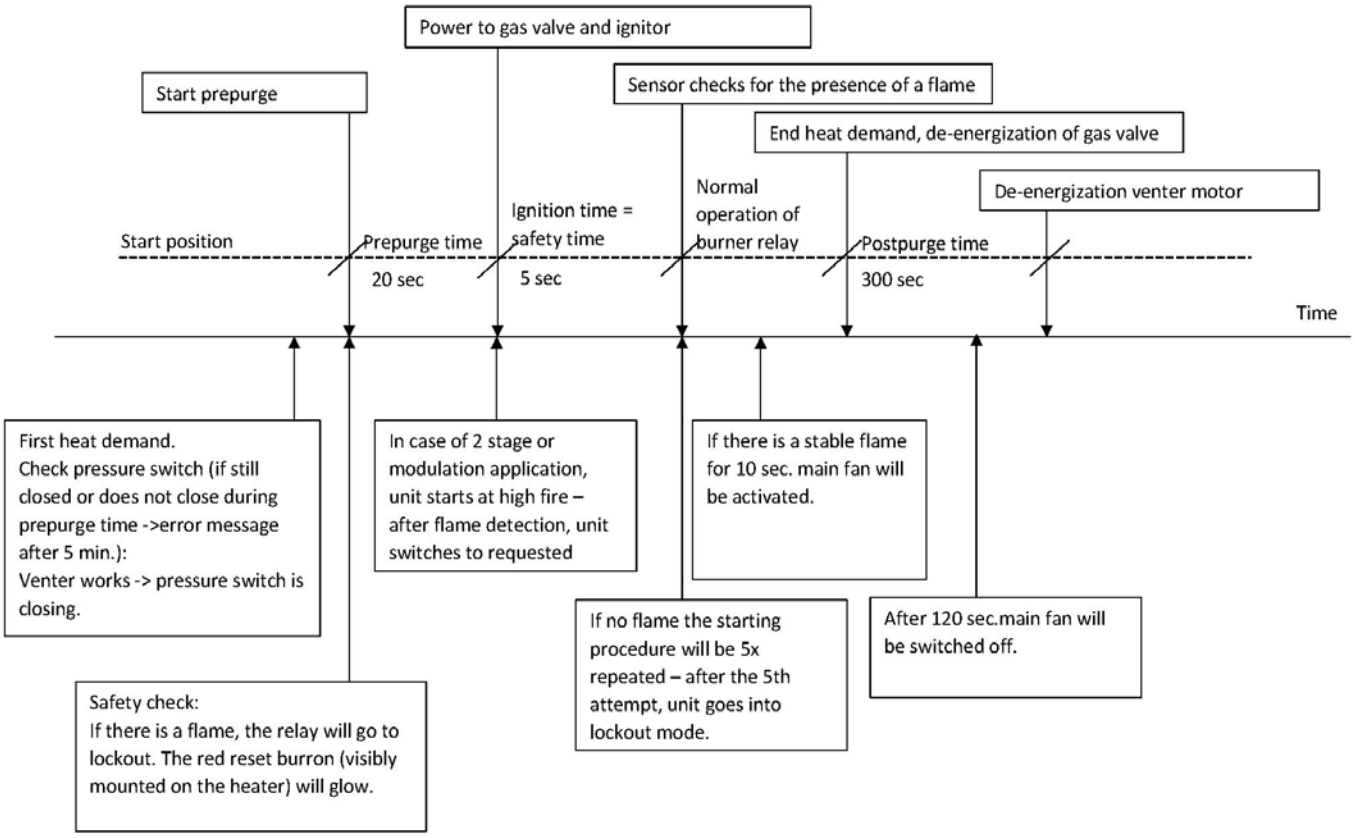
Table 8 : Burner jets and pressures

Diameters/Pressures	UDSBD-4E								
	015	**020**	**025**	**030**	**035**	**043**	**050**	**055**	**064**
Natural Gas (G20)*									
Burner jet (diameter)	3.70	4.20	4.80	5.30	5.75	6.50	6.80	7.10	8.00
Burner pressure, high (mbar)	7.80	7.10	8.20	7.50	7.65	7.40	7.90	8.40	7.90
Burner pressure, low (mbar)	2.00	1.80	2.10	1.90			2.00	2.10	2.00
Propane (G31)**									
Burner jet (diameter)	1.95	2.15	2.60	2.80	3.10	3.35	3.70	3.90	4.15
Burner pressure, high (mbar)	36.90		36.80		35.20	34.80	35.80	35.70	35.60
Burner pressure, low (mbar)	15.60				14.90	14.70	15.10		15.00
*Minimum inlet pressure = 16,6 mbar. Low fire is 50% full rate.									
**Minimum inlet pressure = 35,2 mbar. Low fire is 65% full rate.									

IGNITION SYSTEM

This heater is equipped with a direct spark integrated control relay. The control relay monitors the safety devices and controls the operation of the venter motor and the gas valve between heat cycles. The time line below illustrates a normal heat cycle.

Normal heat cycle operating sequence



Definitions

Start position: The system is not in lock-out position and can proceed with the startup sequence upon a demand for heat.

Pre-purge time: The 20-second period during which the combustion fan (venter) operates prior to activation of the ignition device.

Safety time: The safety time is the 5-second delay between the gas valve being energized and the flame sensor checking for flame.
Note: If no flame is sensed, the burner relay will **attempt ignition 5 times before going into lock-out mode.**

Post-purge time: The 10-second period between burner shut-down and the moment the combustion fan (venter) is de-energized.

13 MAINTENANCE/SERVICE

Warning :
If you turn off the power supply, always turn off the gas.

The material contained in the MAINTENANCE AND SERVICE section of this manual is designed to aid a qualified service technician in maintaining and servicing this equipment. This heater will operate with a minimum of maintenance.

To ensure long life and satisfactory performance, a heater that is operated under normal conditions should be inspected and cleaned at the start of each heating season (inspection and maintenance at least once a year). If the heater is operating in an area where an unusual amount of dust or other impurities are present in the air, more frequent maintenance is recommended.

When any service is completed, be careful to reassemble correctly to ensure that no unsafe conditions are created. When starting the heater, always follow the lighting instructions on the heater.

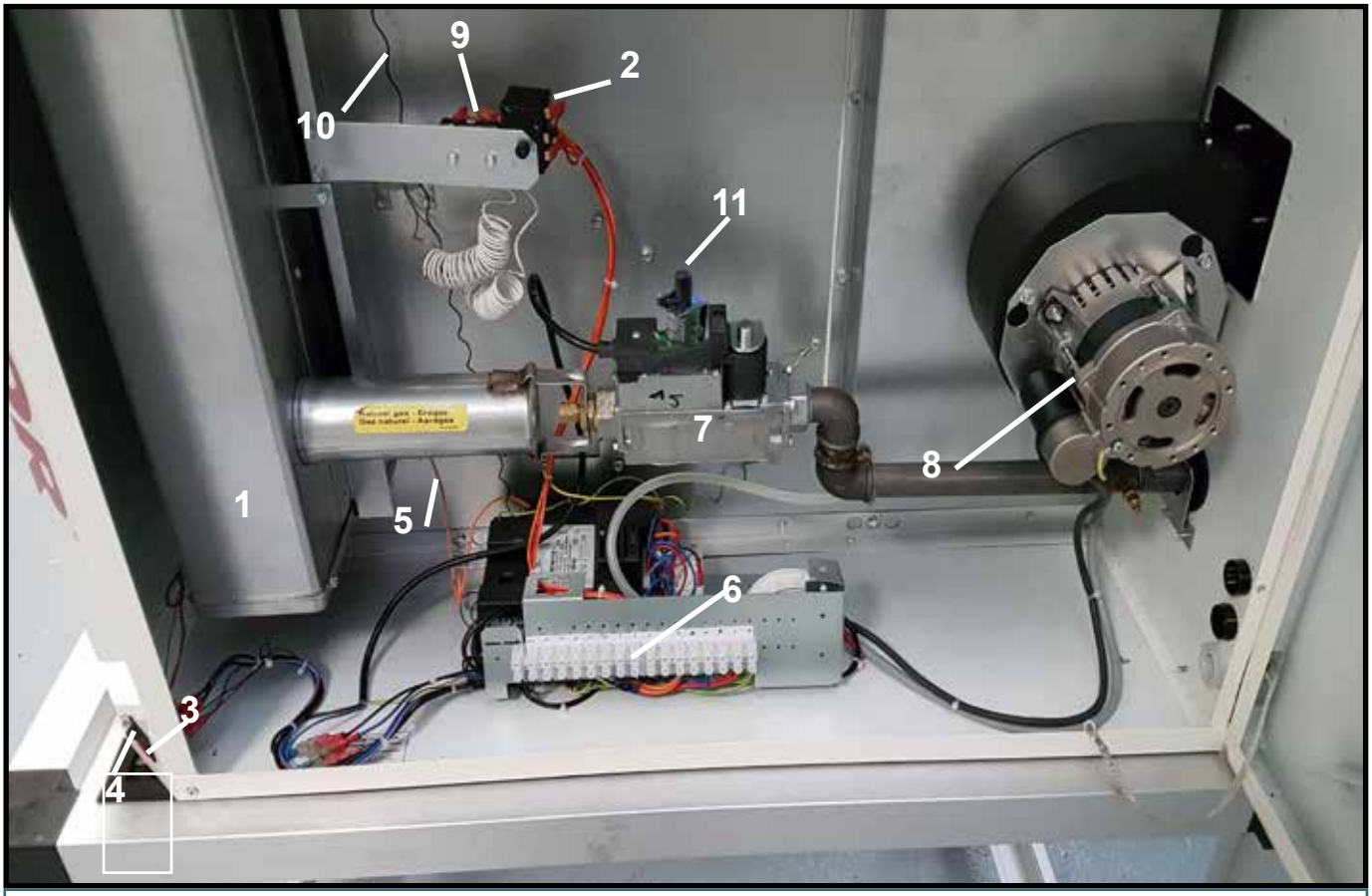
- Check the vent or vent/combustion air system for soundness. Replace any parts that do not appear sound.
- Check the wiring for any damage. Replace damaged wiring.

NOTE: If replacement parts are required, use only factory-authorized parts.

Maintenance Schedule: The following procedures should be carried out at least once each year (see Figure 11a) :

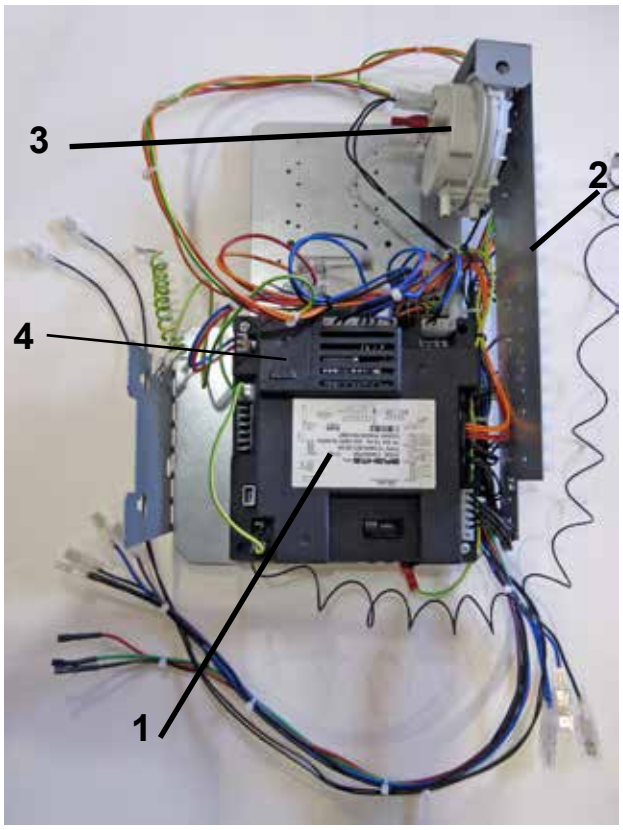
- Clean all dirt, lint, and grease from the fan blade, fan guard, and motor.
- Check the heat exchanger both internally and externally for evidence of physical damage.
- Check the burner for scale, dust, or lint accumulation. Clean if required.

Figure 11a : Location of controls



1) Burner	5) Spark ignitor (ER)	9) Limit control LC1
2) LC3 limit control	6) Control panel	10) Flame sensor (IS)
3) Burner operating led	7) Main gas valve (V1)	11) Modulating gas valve (VM)
4) Reset switch (S5)+burner lockout	8) Venter motor.	

Figure 11b : Control panel assembly located on a removable bracket



1) Control relay (ER)
2) Terminal blocks
3) Pressure switch (S3)
4) Electronic burner relay fuse 3.15AF

14 HEAT EXCHANGER MAINTENANCE

This heater is equipped with a patented T-CORE$^{2®}$ heat exchanger.

Remove any external dirt or dust accumulation. Visually check the heat exchanger for cracks and holes. If a crack or hole is observed, replace the heat exchanger.

15 BURNER MAINTENANCE

This heater has a unique one-piece T-CORE$^{2®}$ burner assembly designed to provide controlled flame stability without lifting or flashback. The burner can be removed as a unit for inspection or service : see below for removal instructions.

Instructions for burner removal:

1. Outside the cabinet, shut the gas supply off at the manual valve ahead of the union
2. Turn off the electric supply.
3. Disconnect the gas supply at the union outside of the cabinet.
4. Open the access door.
5. **Disconnect the manifold and move it out of the way.** At the gas valve, mark and disconnect the connector. Carefully remove the burner orifice and orifice adapter locking nut. Slide the orifice adapter out through the bracket on the burner pushing the manifold to the right. This will move the manifold out of the way. See Figure 14 for component definitions.

Figure 12a :

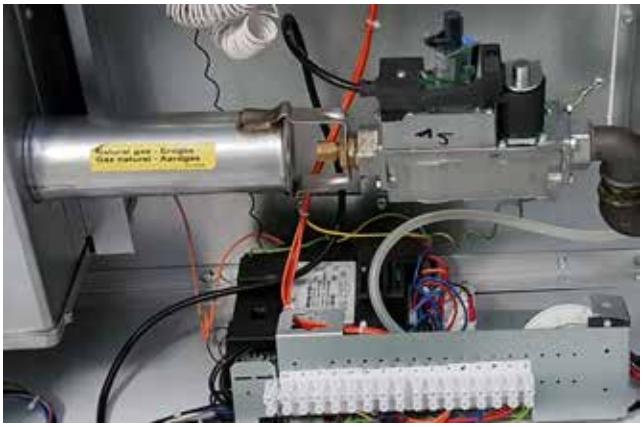
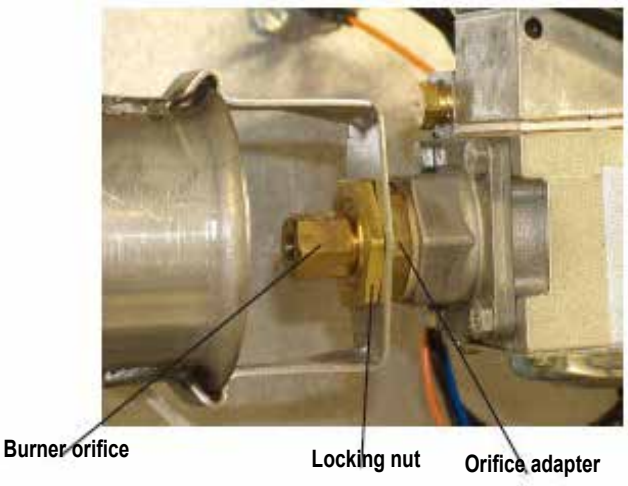


Figure 12b :



Inspect the burner/control compartment annually to determine if cleaning is necessary. If there is an accumulation of dirt, dust, and/or lint, clean the compartment and follow the instructions below to remove and clean the burner.

Caution :

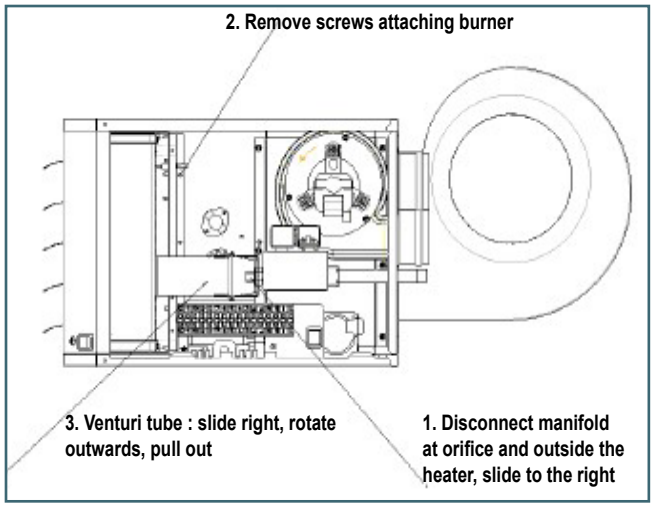
Use of eye protection is recommended.

6. **Remove burner:**
   a) Locate the burner body front support. Remove the screws that attach it to the secondary air shield. See Figure 14 for component definitions.
   b) Holding the venturi tube, slide the entire burner slightly to the right to disengage the burner from the supports on the left. Then rotate the open end of the venturi tube outward away from the heater. Carefully pull the burner assembly out of the cabinet.

Figure 13a :

Figure 13b :

Figure 14 : Burner removal steps



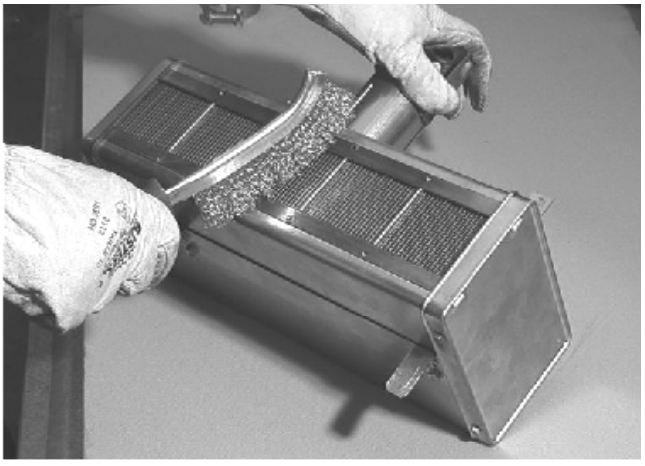
Inspect and clean the burner

With the burner assembly removed, shine a flashlight on the burner ribbons. Look for carbon buildup, scale, dust, lint, and/or anything that might restrict flow through the spaces between the burner ribbons. Holding the burner assembly so that any foreign material will fall away from the burner, use a stiff bristle brush to loosen and remove any foreign material(s). If the burner is excessively dirty, remove one of the burner end caps. Remove the four screws that hold the end cap to the burner housing. Lightly tap the end cap to remove it.

Clean all foreign material from the burner and venturi. After the burner is thoroughly clean, replace the end cap making certain that it is tight against the burner housing.

NOTE: If any of the burner components are damaged or deteriorated, replace the burner assembly.

Figure 15: Cleaning burner



Inspect the Internal Portion of the Heat Exchanger (with burner assembly removed)

At the burner flame entrance of each tube, shine a bright light into each heat exchanger section. With the light shining into the heat exchanger, observe the outside surface of the tube where discoloration is evident. Repeat this procedure with each heat exchanger tube. If any light is observed in these high temperature regions, replace the heat exchanger.

Reinstall the burner

Repeat 'Burner removal' steps above in the opposite order.

16 BURNER ORIFICE

The burner orifice normally needs to be replaced only when a change in gas is made. When ordering a replacement orifice, provide (MJ/m^3) heating value and specific gravity of gas, as well as the model and serial number of the unit. When removing or replacing the burner orifice be careful not to damage the venturi tube and/or the bracket.

17 IGNITION SYSTEM

Ignitor: See Figure 11a and locate the ignitor. Disconnect the wire; remove the screw and the ignitor. Clean the ignitor assembly with an emery cloth.

Spark gap must be maintained to 3 mm (see Figure 16a).

Important : When reassembling, the wire must remain attached to the ignitor.

Figure 16a : Ignitor showing required spark gap measurement

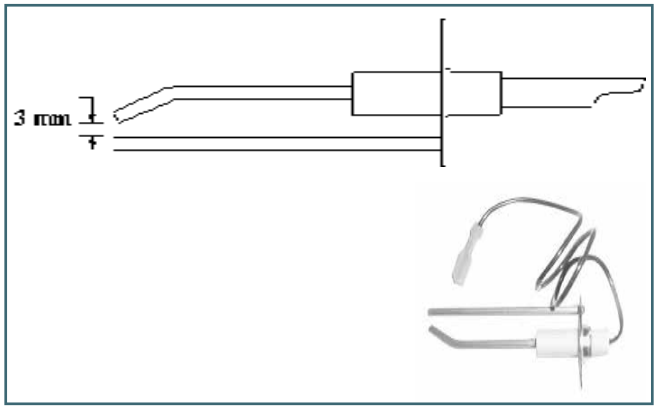
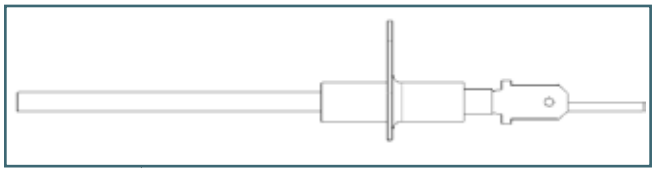


Figure 16b : Flame sensor



Caution :
Due to high voltage on the spark wire and electrode, do not touch when energized.

Flame sensor: See Figure 11a and locate the flame sensor. Disconnect the wire, remove the screw and the flame sensor. Clean with an emery cloth.

Control relay: See Figure 17. The electronic burner relay monitors the operation of the heater including ignition. Do not open the control relay. Each heating season check the lead wires for insulation deterioration and good connections.

Proper operation of the direct spark ignition system requires a minimum flame signal of 1.0 microamps (DC) as measured by a microammeter.

For further information and check out procedure on the direct spark ignition system, refer to section 12 and the Troubleshooting Flow Chart in section 25.

Figure 17 : Control relay Brahma TC340A

18 BLOWER MOTOR

The blower motor is equipped with thermal overload protection of the automatic reset type. Should the motor fail to run, it may be because of improper voltage characteristics. Make certain that the correct voltage is available at the motor.

19 CENTRIFUGAL FAN

Remove dirt and grease from the motor and the blower wheel. Use care when cleaning the wheel to prevent causing misalignment or imbalance.

Follow these instructions for replacement of the direct driven centrifugal fan.

1. If the heater is installed, turn off the gas and disconnect the electric power.
2. Open the connection box on the blower and disconnect the fan motor wires.
3. Remove the blower.
4. Position the new blower on the heater.
5. Reconnect the fan motor wires according to the wiring diagram and close the connection box on the blower.
6. Restore power to the heater and turn on the gas. Light, following the instructions on the lighting instruction plate. Check for proper operation.

20 VENTER MOTOR AND WHEEL

Remove dirt and grease from the motor casing, the venter housing, and the venter wheel. Venter motor bearings are permanently lubricated.

Follow these instructions for replacement of the venter motor and wheel assembly. Keep all hardware removed to be used in reassembling and installing the replacement parts.

1. Turn off the gas and disconnect the electric power.
2. Open the control compartment access door.
3. Disconnect the three venter motor wires at the control relay and ground screw (located on the control panel).
4. Holding the motor, remove the screws that attach the motor plate to the venter housing. Remove the motor and wheel assembly from the heater.
5. Reassemble with the replacement venter motor and wheel assembly.
6. Follow the wiring diagram to properly connect the wires.
7. Restore power to the heater and turn on the gas. Light, following the instructions on the lighting instruction plate. Check for proper operation. Replace the access door.

Venter wheel position on shaft

Figure 18a : UDSBD-4E models 015 through 020 (rotation clockwise from motor shaft end)

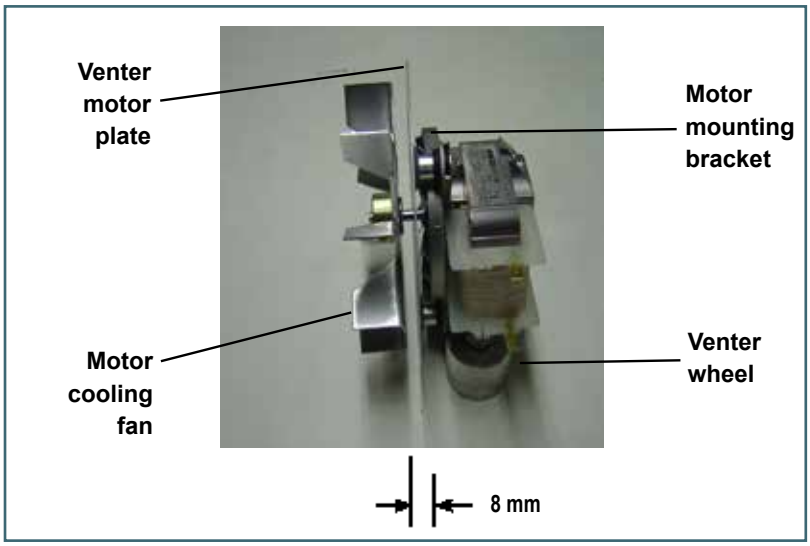


Figure 18b : UDSBD-4E models 025 through 030 (rotation clockwise from motor shaft end)

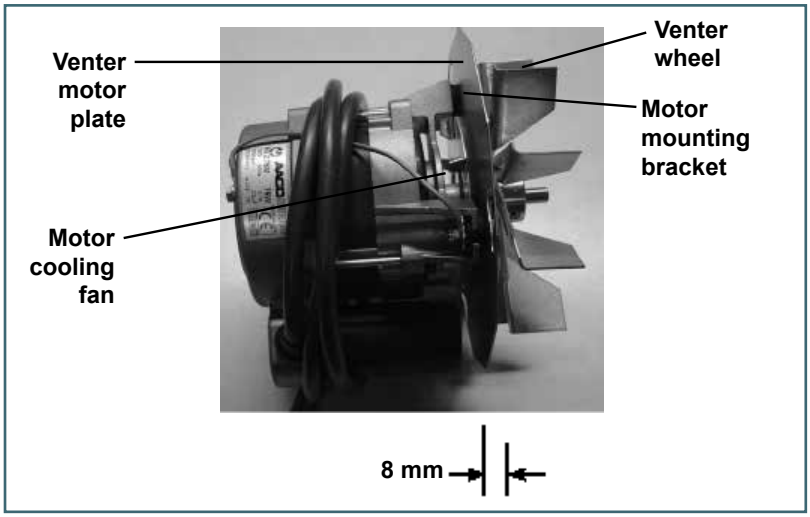
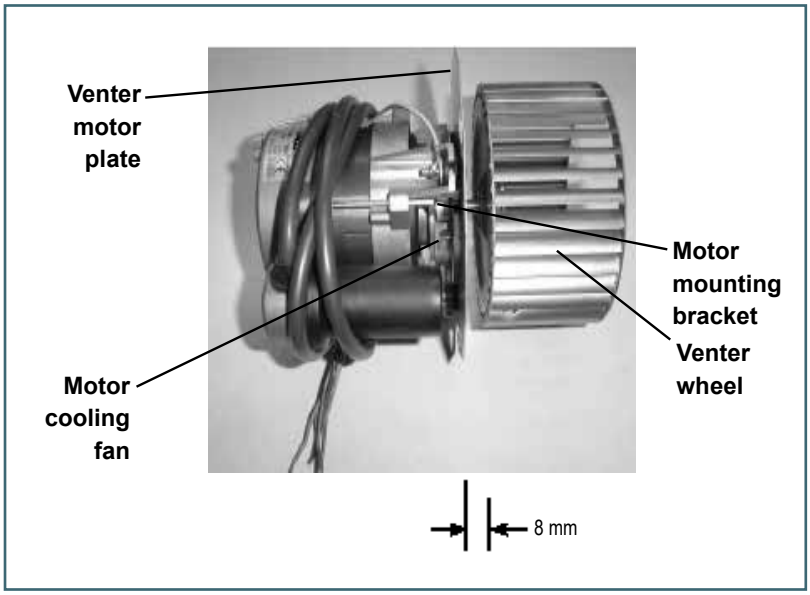


Figure 18c : UDSBD-4E models 035 through 064 (Rotation counter-clockwise from motor shaft end)



21 OPERATING GAS VALVE

The main operating quick opening gas valve is powered through the thermostat and safety controls. The main control valve is of the diaphragm type providing regulated gas flow and is preset at the factory. The gas valve requires no field maintenance except careful removal of external dirt accumulation and checking of wiring connections. Instructions for testing pressure settings are in section 12.

Warning:
The operating valve is the prime safety shutoff. All gas supply lines must be free of dirt or scale before connecting to the unit to ensure correct sealing.

22 COMBUSTION AIR PRESSURE SWITCH

DANGER
Safe operation of this unit requires proper venting flow. Never bypass the combustion air pressure switch or attempt to operate the unit without the venter operating.

The combustion air pressure switch ensures that proper combustion airflow is available. The switch senses the differential pressure between the negative pressure in the flue gas collector box and the pressure in the control section.

On startup when the heater is cold, the sensing pressure is at the most negative level, and as the heater and flue system warm up, the sensing pressure becomes less negative.

If a restriction or excessive flue pipe length causes the sensing pressure to be below the allowable level, the pressure switch will shut off the main burner.

If it is determined that the pressure switch needs replacing, use only the factory-authorized replacement part that is designed for the model and size of heater being serviced.

Figure 19 :

23 LIMIT CONTROLS

All units are equipped with temperature activated limit controls. The controls are factory set and non-adjustable. If either set-point is reached, the corresponding limit control will interrupt the electric power to the gas valve. These safety devices provide protection in the case of motor failure or lack of airflow due to restrictions. For locations, see Figure 11a.

If a limit control needs replacing, use only the factory authorized replacement part for the size of heater.

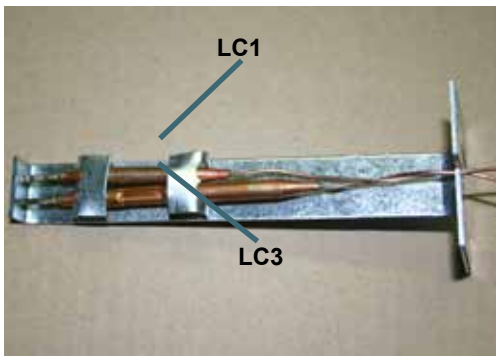
For approximate limit locations, see Figure 11a.

Warning :
Never bypass the limit controls, hazardous conditions could result.

Figure 20 : LC1

Figure 21 : LC3

Figure 22 : Location LC1/LC3



24 FLUE AND COMBUSTION AIR PIPING

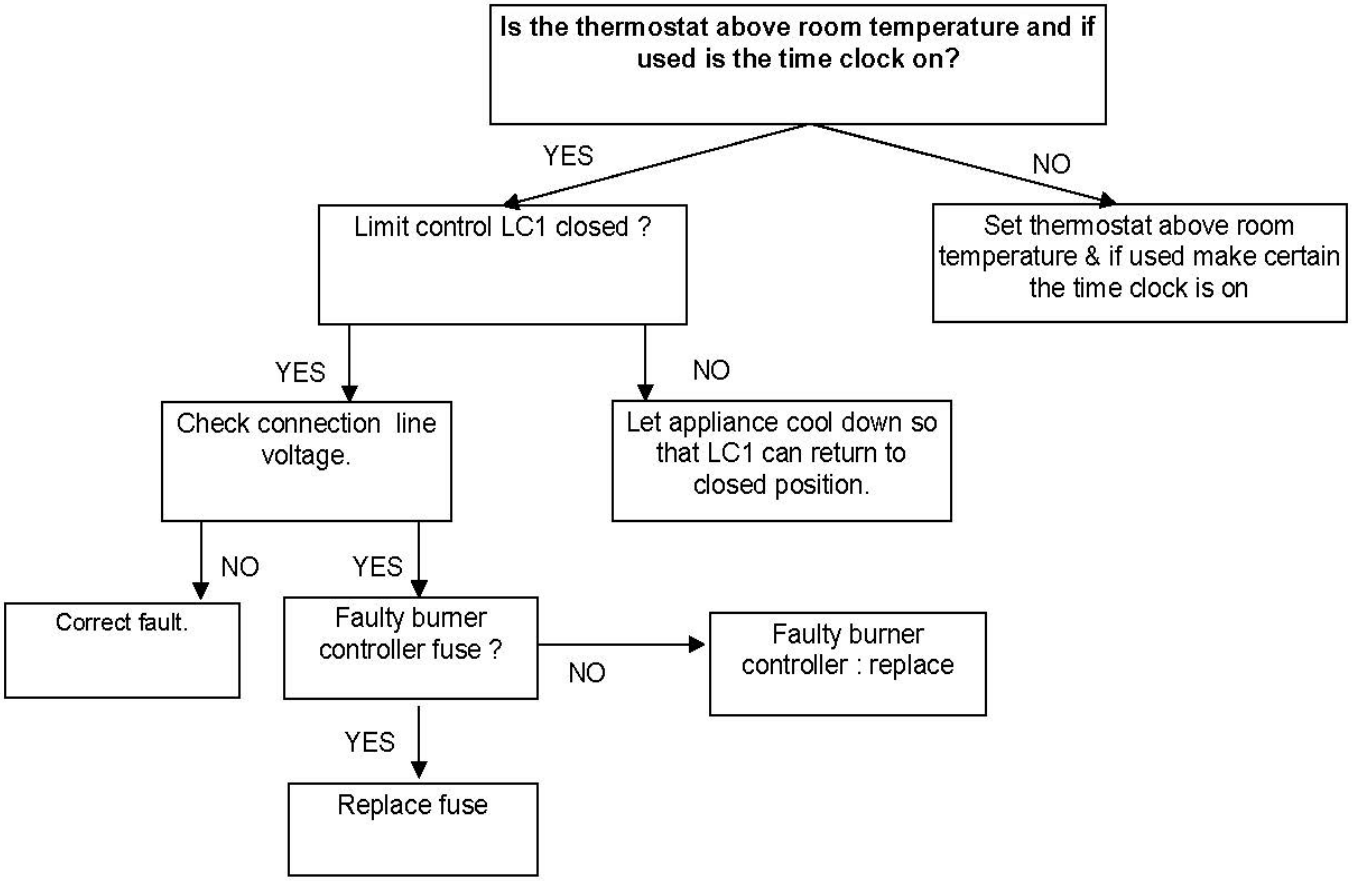
Check the complete system at least once a year. Inspection should include all joints, seams, concentric adapters and the flue terminal cap. Replace any defective or heavily corroded parts.

25 TROUBLESHOOTING

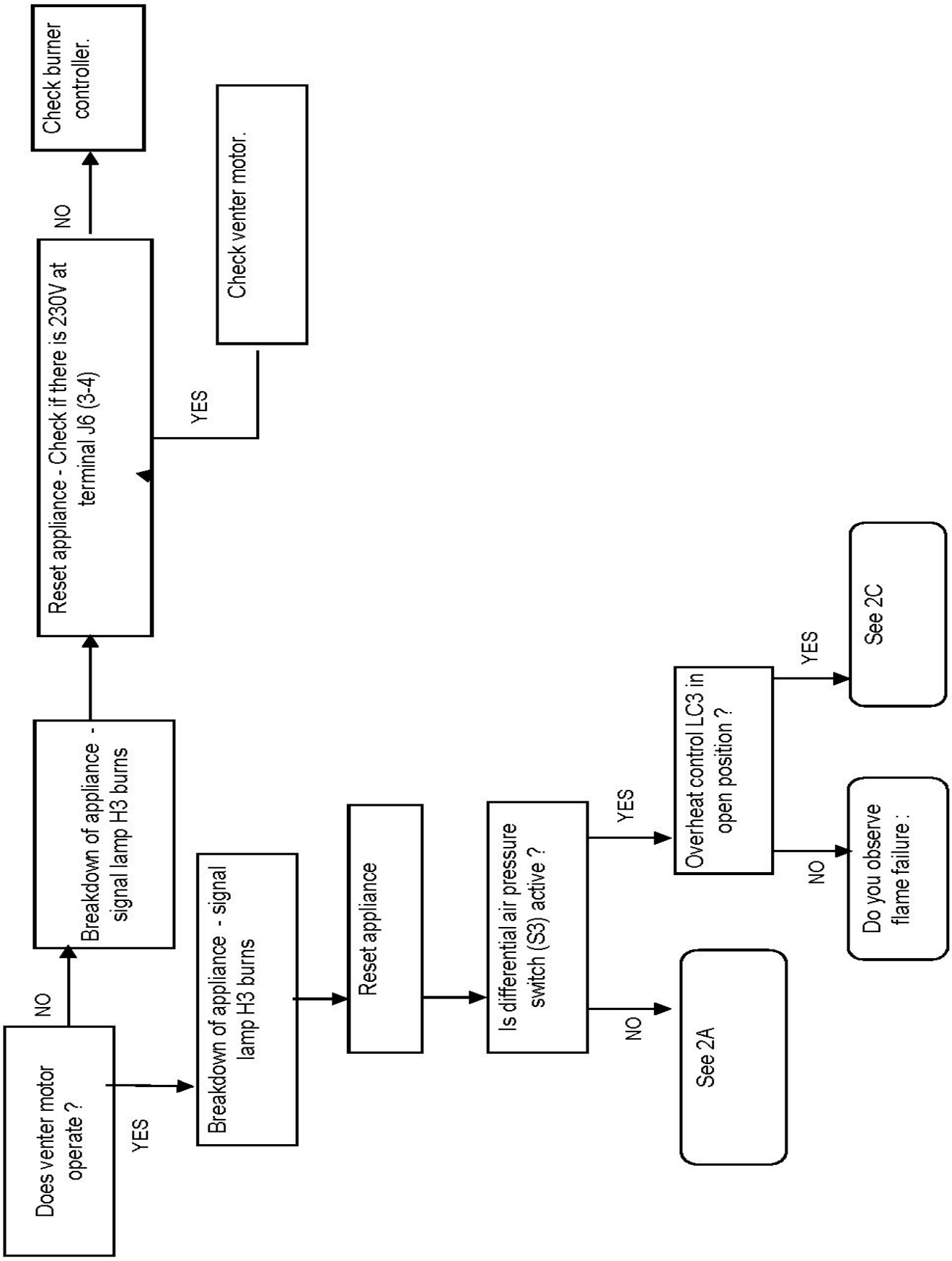
The integrated control relay monitors the operation of the heater. If the heater fails to operate properly, review the flow chart below and see the operating sequence in section 16.

The general troubleshooting charts on the following pages will also help you to determine the problem.

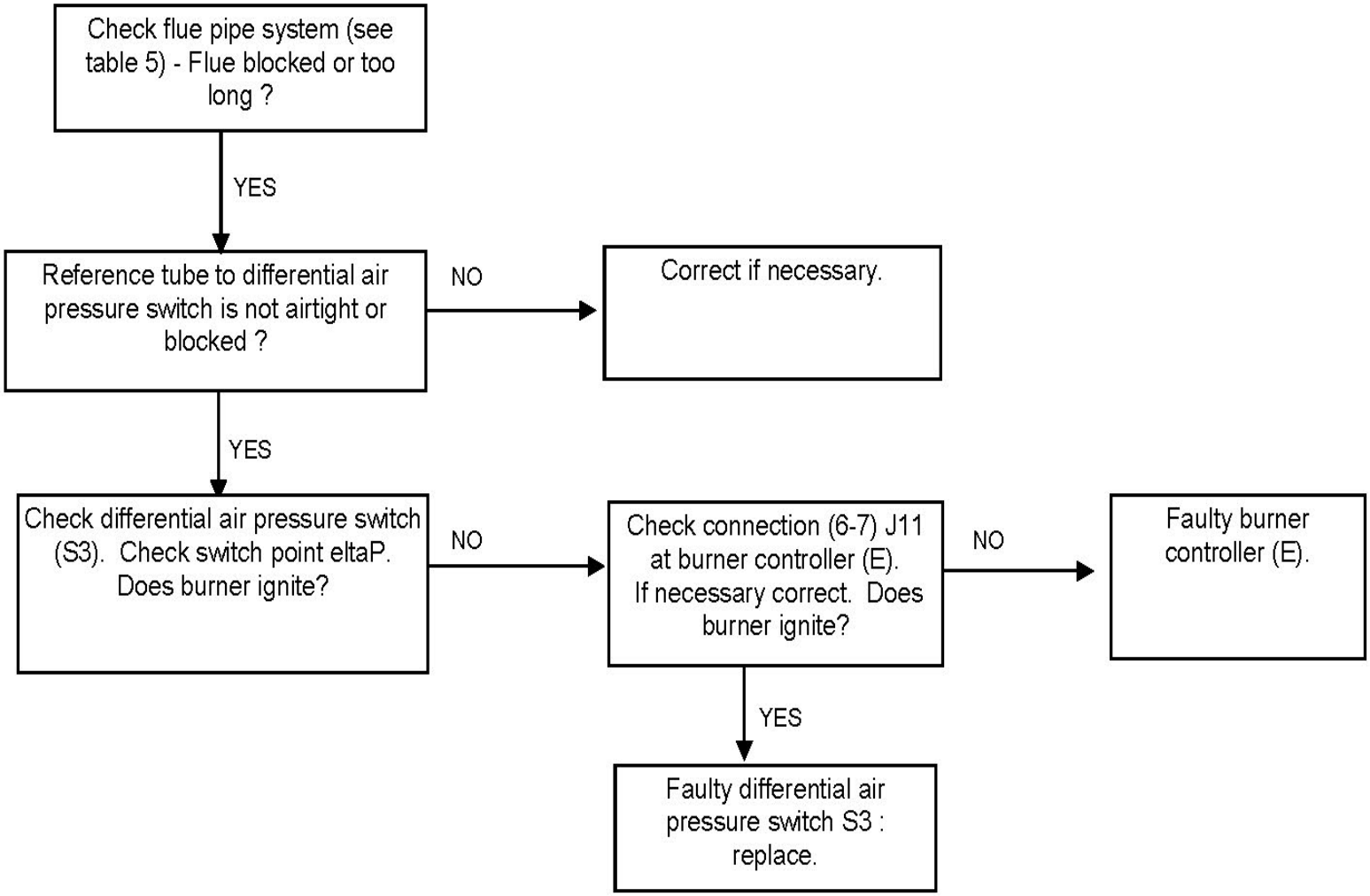
1/ Air heater does not operate and lock-out indicator light is off

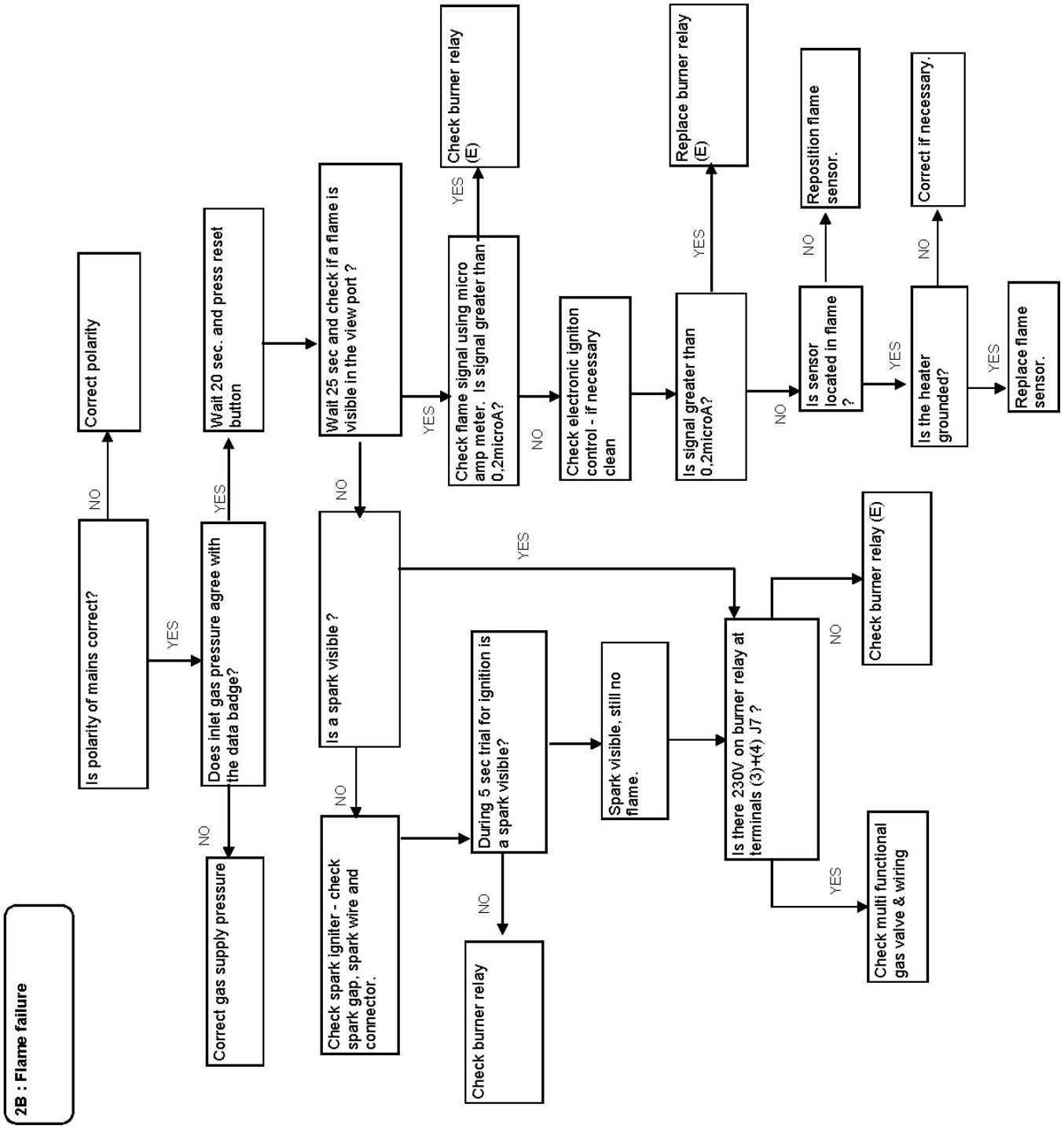


2/ Air heater does not operate and lock-out indicator light is on



2A : Faulty differential air pressure switch




2B : Flame failure
Is polarity of mains correct?
NO
Correct polarity
YES
Does inlet gas pressure agree with the data badge?
NO
Correct gas supply pressure
YES
Wait 20 sec. and press reset button
Wait 25 sec and check if a flame is visible in the view port ?
YES
Check flame signal using micro amp meter. Is signal greater than 0,2microA?
YES
Check burner relay (E)
NO
Check electronic igniton control - if necessary clean
Is signal greater than 0,2microA?
YES
Replace burner relay (E)
NO
Is sensor located in flame ?
NO
Reposition flame sensor.
YES
Is the heater grounded?
NO
Correct if necessary.
YES
Replace flame sensor.
NO
Is a spark visible ?
YES
NO
Check spark igniter - check spark gap, spark wire and connector.
During 5 sec trial for ignition is a spark visible?
NO
Check burner relay
Spark visible, still no flame.
Is there 230V on burner relay at terminals (3)+(4) J7 ?
NO
Check burner relay (E)
YES
Check multi functional gas valve & wiring

2C : Limit controls LC1 (auto reset) & LC3 (manual reset) switch burner off

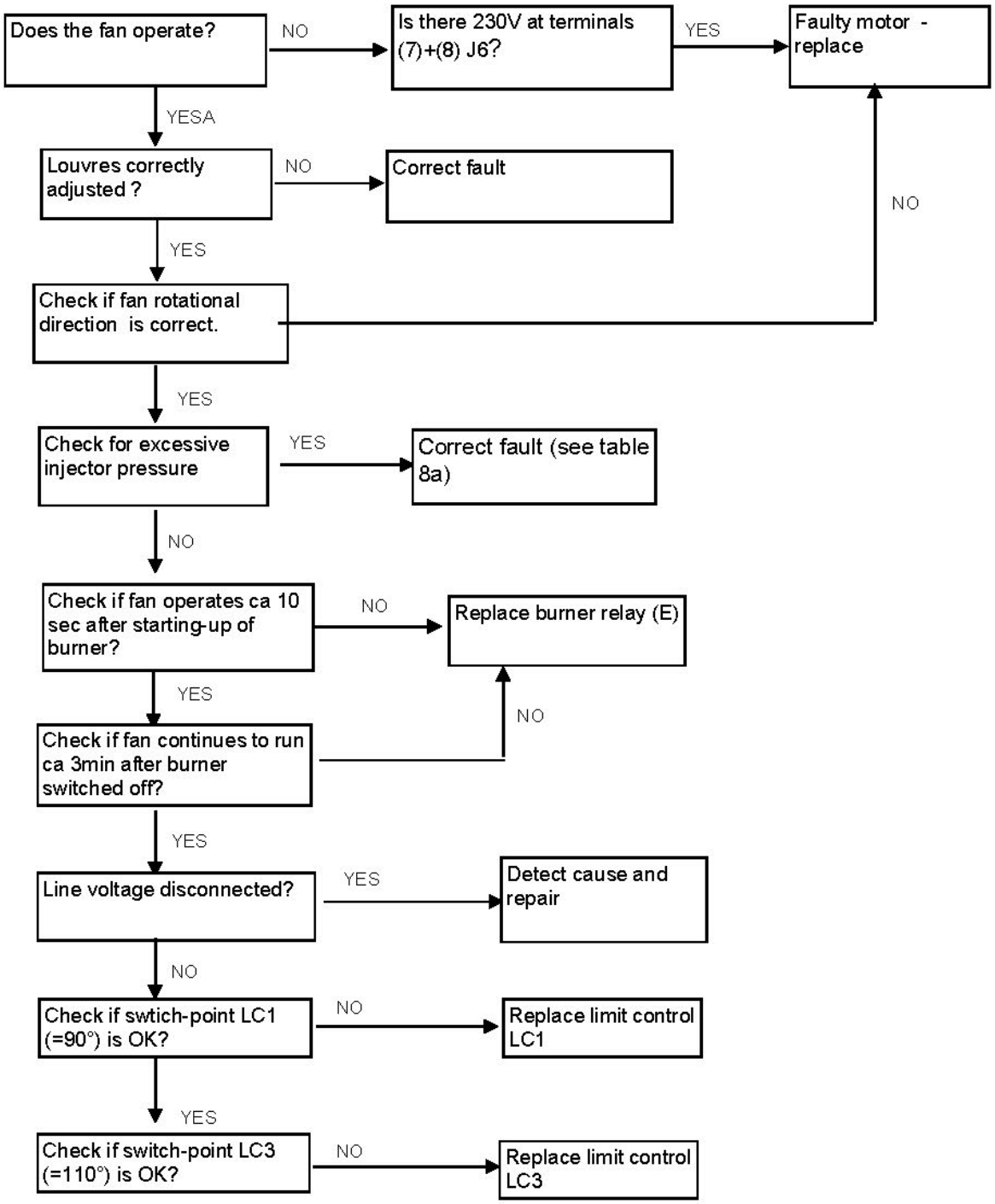


Table 9 : General troubleshooting

Problem	Probable Cause	Remedy
Venter motor will not start	1. No power to unit	Turn on power
		Check supply fuses or circuit breaker
	2. No power to venter motor	Check connections at burner relay and/or venter motor terminals
	3. Integrated burner relay defective	Replace burner relay
	4. Defective venter motor	Replace venter motor (refer to section 26)
	5. Fuse blown (F3.1)	Replace fuse
	6. Fuse burner relay blown	Replace fuse
	7. LC1 open	Set heater on ventilation until LC1 closes
		Replace LC1
		Check for obstruction at fan side
	8. LC3 open	Reset LC3
	9. Unit in lock-out	Replace LC3
		Push on reset button
	10. Room thermostat open	Set thermostat above room temperature
Burner will not light	1. Main valve not operating	Check voltage on valve during ignition period
		Check connector on main gas valve
		Check connector on burner relay
		Replace valve
	2. Air in gas line	Purge gas line
	3. Gas pressure too high or too low	Supply pressure should be 15 mbar for natural gas (UK only) or 37 mbar for propane gas (UK only)
		Obstruction in gas line
		Gas line connection diameter too small
	4. No spark	Check following:
	a) Loose wire connections	Ensure that all wire connections are solid
	b) Incorrect spark gap	Maintain spark gap at 3 mm
	c) Spark cable has short circuit to ground	Replace worn or grounded spark cable
	d) Spark electrode has short circuit to ground	Replace ceramic spark electrode if cracked or grounded
	e) Burner relay not grounded	Check burner relay ground wire
	f) Unit not properly grounded	Ensure that unit is properly field grounded (earthed) and properly phased (L1 to hot lead, L2 to neutral)
	g) Faulty burner relay	If voltage is available to burner relay and all other causes have been eliminated, replace burner relay
	5. Combustion airs pressure switch not closing upon power to venter	Check following in order:
		Ensure that unit is properly vented
		Remove obstructions from vent
		Replace faulty tubing to pressure switch
		Replace faulty pressure switch
Burner cycle on and off	1. Gas pressure too high or too low	Supply pressure should be 15 mbar for natural gas (UK only) or 37 mbar for propane gas (UK only)
	2. Burner relay not grounded	Check burner relay ground wire connection
	3. Faulty burner relay	If 220/240 volts is available to burner relay and all other causes have been eliminated, replace burner relay
	4. Flame sensor grounded	Ensure that flame sensor lead is not grounded or insulation or ceramic is not cracked; replace as required
	5. Cracked ceramic at sensor	Replace sensor
	6. Incorrect polarity	Check polarity switch and if necessary reverse line voltage wires to terminal block connections
Blower will not run	1. Circuit open	Check wiring and connections
	2. Defective time delay relay for the fan (KFC)	Replace time delay relay
		Check voltage on anticipation resistor when gas valve is open
	3. Defective motor	Replace blower and motor
Blower or venter motor turns on and off while burner is operating	1. Motor internal thermal protection device cycling on and off	Check motor load against motor rating plate; replace motor if needed
Venter motor turns off in case of thermal overload	1. Electrical current too high or too low	Correct electrical current
	2. Motor defect	Replace motor
	3. Insufficient air flow	Clean motor, venter, and filter
	4. Faulty bearing	Oil bearing or replace motor

26 PARTS LIST

Description	UDSBD-4E Model	Part Number
Control relay	015 → 064	03 25321
Spark ignitor	015 → 064	05 25162
Flame sensor	015 → 064	03 401US 195292
Limit control LC3	015 → 064	03 24959 03
Limit control LC1	015 → 064	03 24959 04
Pressure switch	015, 020, 025, 050, 055, and 064	30 60621 120
	030	30 60621 100
	035 → 043	30 60621 94
Burner-on indication lamp	015 → 064	60 61997
Reset switch	015 → 064	60 61998
Gas valve natural gas 2st.	015 → 043	03 25141 P
	050 → 064	03 25136 02
Gas valve propane 2st.	015 → 043	03 25141 P337
	050 → 064	03 35136 P437
Gas valve natural gas modureg	015 → 043	03 25140 M
	050 → 064	03 35145
Gas valve propane modureg	015 → 043	03 25140 M
	050 → 064	03 35145
Venter motor	015 → 020	11 43430 01
	025 → 064	11 43426 04
Venter assembly	015 → 020	35 25218
	025 → 030	35 25222
	035 → 064	35 25223
Venter wheel assembly	015 → 020	90 82242
	025 → 030	90 82244
Venter wheel	035 → 064	02 25728
Direct driven blower DD 9/7	015 → 020	01 27211
Direct driven blower DD 10/10	025 → 030	01 27210
Direct driven blower DD 12/12	035 → 064	02 26012 035064
Main wiring assembly	015 → 064	06 41852

NORTEK
GLOBAL HVAC

CERTIFICATE

EC DECLARATION OF CONFORMITY OF MACHINERY
(Annex II 1 A of EC Machinery Directive 2006/42/EC)

Nortek Global HVAC Belgium nv
J&M Sabbestraat 130/A000
B-8930 Menen, Belgium

Hereby declares that the following gas-fired unit heaters:
UDSBD-4E
Types 015, 020, 025, 030, 035, 043, 050, 055, 064
Complies with the requirements of the above mentioned machinery directive

Complies with the requirements of further directives, namely
GAD 2009/142/EC - EMC 2014/30/EU – LVD 2014/35/EU

The following harmonized standards have been applied:
EN 1020: Non-domestic gas-fired forced convection air heaters for space heating not exceeding a net heat input of 300 kW, incorporating a fan to assist transportation of combustion air and/or combustion products.

The following notified body
Technigas
Chaussée de Vilvorde 156
BE 1120 Brussels
has been involved with regarding to the
EC type examination number E0827/5331
Menen, 31.01.2018

J. Dubus
Engineering Team Leader

Information Requirements for Warm Air Heaters Commission Regulation (EU) 2016/2281											
B1 warm air heater	NO										
C2 warm air heater	NO										
C4 warm air heater	NO										
Type of fuel: GAS: G20/G25											
	Model: UDSBD-4E		**015**	**020**	**025**	**030**	**035**	**043**	**050**	**055**	**064**
Item	**Symbol**	**Unit**									
Capacity											
Rated heating capacity	$P_{rated,h}$	kW	14.77	18.35	25.75	29.59	35.06	43.01	49.47	55.69	65.45
Minimum capacity	P_{min}		8.83	8.96	12.64	14.56	17.25	21.14	24.31	27.31	31.99
Electric Power Consumption*											
At rated heating capacity	el_{max}	kW	0.04		0.08						
At minimal capacity	el_{min}										
In standby mode	el_{sb}		0.02								
Useful Efficiency											
Useful efficiency at rated heating capacity*	η_{nom}	%	83.8	83.4	83.6	84.0	83.7	84.6	84.4	84.3	84.2
Useful efficiency at minimum capacity*	η_{pl}		81.8	81.4	82.0	82.7	82.4	83.1	82.9	82.7	82.3
Other Items											
Envelope loss factor	F_{env}	%	0								
Ignition burner power consumption*	P_{ign}	kW	0.02								
Emissions of nitrogen oxides [input energy (GCV)]*	NO_x	mg/kWh	98.0	97.5	93.3	94.3	98.6	97.2	94.5	90.1	92.9
Emission efficiency	$\eta_{s,flow}$	%	92.9	93.9			94.4	94.6			
ERP seasonal space heating energy efficiency	$\eta_{s,h}$		72.8	74.4	74.8	75.5	75.8	76.9	76.7	76.6	76.4
Thermal efficiency at rated heating capacity [NCV]	η_{th}		93.1	92.6	92.8	93.3	93.0	93.9	93.7	93.6	93.5
*Not required for electric warm air heaters.											
Contact details: Nortek Global HVAC, **www.reznor.eu**.											

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