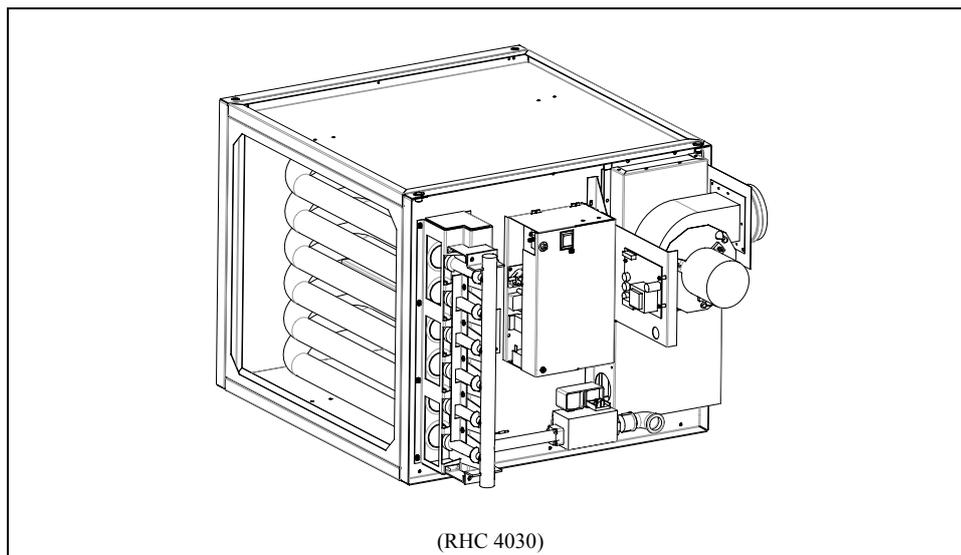


Gas-Fired, Balanced-Flue or Power-Vented Unit Heaters

RHC 4011, 4015, 4018, 4024, 4030 & 4036 DJL for indoor use
RHC 4011, 4015, 4018, 4024, 4030 & 4036 RJL for outdoor use

**INSTRUCTION DOCUMENT APPLIES FOR:
Installation/Commissioning/Serviceing**



Applies to

Belarus, Bulgaria, China, Czech Republic, Croatia, Cyprus, Denmark, England, Estonia, Finland, Greece, Hungary, Iceland, Latvia, Lithuania, Montenegro, New Zealand, Norway, Poland, Romania, Russian Federation, Serbia, Slovakia, Slovenia, Spain, Sweden, Turkey, Ukraine

These appliances meet the following EC Directives

DIR 2009/142/EC:GAD

DIR 2004/108/EC: EMC

DIR 2006/95/EC: LVD

WARNING

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

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 harmful operation possibly resulting in damage to the apparatus and/or environment in which the unit is installed.

Subject to modifications

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HAZARD INTENSITY LEVELS

1. **DANGER:** Failure to comply will result in severe personal injury or death and/or property damage.
2. **WARNING:** Failure to comply could result in severe personal injury or death and/or property damage.
3. **CAUTION:** Failure to comply could result in minor personal injury and/or property damage.

WARNINGS:

The electrical isolator should only be used in an emergency and should not be used for closing down the main burner, as it switches off the fan prematurely and may damage the heat exchanger, invalidating the warranty.

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

1.0 INTRODUCTION

1.1 BASIC INFORMATION

The instructions in this manual apply to the following gas-fired/fan-assisted warm air heaters:

RHC 4000 DJL

Model suitable for indoor air handlers only (when installed where the height above floor level is greater than 1,8 meters measured to the underside of the appliance they may be used as a garage air heater).

Model RHC 4000 DJL heaters are approved for:

Type C₁₂ - horizontal vent for balanced-flue heaters;

Type C₃₂ - vertical vent for balanced-flue heaters;

Type B₂₂ – vertical vent (through the roof) or horizontal vent (through the wall)

RHC 4000 RJL

Model suitable for incorporation in air handlers built for outdoor installation only.

Model RHC 4000 RJL heaters are approved for outdoor or rooftop application.

Appropriate gas category : see table 2A.

All models & sizes are available for use with either natural, propane or butane gas with operating temperatures between -15°C and 40°C.

These instructions are only valid for the country of use as indicated on the appliance. If these symbols are not shown, it is necessary to obtain appropriate technical instructions. Such instructions may be obtained upon request from your supplier.

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

The installation must comply with the requirements and recommendations of all relevant national and local standardisations.. The installation must also be in accordance with the relevant electrical and IEE regulations.

When the external control calls for heat, an electronic control begins the ignition sequence to provide for a safe start. Under normal conditions the fan motor runs constantly and after a call for heat it switches the heater on through a room or duct stat. However, in some applications, about 30 seconds after the call for heat, the fan control relay will activate the fan motor of the air handler.

The electronic control will supervise the flame during the entire heating cycle to ensure safe operation.

When the required room temperature is reached, the main burner will shut down leaving the fan running to cool down the heat exchanger

In some applications, after approximately 45 seconds, the fan delay relay will turn off the fan (if wired).

1.2 WARRANTY

Warranty is void if:

- Model RHC 4000 DJL/RJL (sizes 4011, 4015, 4018, 4024, 4030 & 4036) heaters are installed in atmospheres containing flammable vapours or atmospheres containing chlorinated or halogenated hydrocarbons or atmospheres containing any silicone, aluminium oxide, etc., that adheres to spark ignition flame sensing probes.
- The installation is not in accordance with these instructions.
- The maximum airflow through the heat exchanger tubes is not respected (see§ 3.5).
- The required minimum air delivery is not respected (see table 3b).
- The duct dimensions do not comply with the prescribed dimensions (see fig. 4).
- The inlet temperature (measured at the heat exchanger inlet) is lower than the value stated on the chart (see fig. 5 : dew point occurrence chart).

2.0 TECHNICAL DATA

2.1 SPECIFICATIONS

Table 1 :

Model	Heat input		Heat output kW	Gas rate ³		Power Consumption kW
	kW gros ¹	kW net ²		G20 m ³ /h	G31 kg/h	
4011	13.00	11.91	10.84	1.26	0.94	0.153
4015	17.60	15.85	14.42	1.68	1.26	0.153
4018	22.00	19.81	17.85	2.10	1.57	0.153
4024	29.30	26.38	24.01	2.79	2.10	0.153
4030	36.60	33.00	29.80	3.49	2.61	0.153
4036	44.00	39.60	36.04	4.20	3.14	0.153

Notes to table 1:

- GCV (Hs)
- NCV (Hi)
- Natural gas G20 gross calorific value 10,48 kW m³ @ 15 °C, 1013,25 mbar
Butane gas G30 gross calorific value 13,7 kW/kg
Propane gas G31 gross calorific vale 14,0 kW/kg

Table 2A : Gas category

Country	Gas category
Belarus	I12H3+
Bulgaria	I2H or I3B/P
China	I12H3+
Czech republic	I12H3+
Croatia	I12H3P
Cyprus	I12H3+
Denmark	I12H3 B/P
Estonia	I12H3+
England	I12H3+
Finland	I12H3 B/P
Greece	I12H3+
Hungary	I12HS3P
Iceland	I12H3+
Latvia	I12H3+
Lithuania	I12H3+

Country	Gas category
Montenegro	I12H3+
New Zealand	I12H3+
Norway	I12H3 B/P
Poland	I12E3P
Portugal	I12H3+
Romania	I12H3P
Russian Federation	I2H or I3P
Serbia	I12H3+
Slovakia	I12H3+
Slovenia	I12H3+
Spain	I12H3+
Sweden	I12H3 B/P
Turkey	I12H3+
Ukraine	I2H or I3P

Table 2B : Injector size and burner pressure

Belarus, China, Croatia, Czech Republic, Cyprus, England, Estonia, Greece, Iceland, Latvia, Lithuania, Montenegro, New Zealand, Portugal, Serbia, Slovenia, Slovakia, Spain , Turkey

		Model	4011	4015	4018	4024	4030	4036
Nat. Gas G20	Injector	quantity	3	4	5	5	6	8
	Injector size	mm	1,85	1,85	1,85	2,20	2,20	2,20
		marking	185	185	185	220	220	220
	Burner pressure (1)	mbar	9,00	8,90	9,00	7,90	8,80	7,50
	Inlet pressure	mbar	20					
Prop. Gas G31	Injector	quantity	3	4	5	5	6	8
	Injector size	mm	1,00	1,00	1,00	1,15	1,20	1,15
		marking	100	100	100	115	120	115
	Burner pressure (1)	mbar	36,90	36,80	36,90	36,50	36,50	36,00
	Inlet pressure	mbar	37					

Romania, Poland, Bulgaria, Denmark, Finland, Norway, Sweden

		Model	4011	4015	4018	4024	4030	4036
Nat. Gas G20	Injector	quantity	3	4	5	5	6	8
	Injector size	mm	1,85	1,85	1,85	2,20	2,20	2,20
		marking	185	185	185	220	220	220
	Burner pressure (1)	mbar	9,00	8,90	9,00	7,90	8,80	7,50
	Inlet pressure	mbar	20					
Prop. Gas G31	Injector	quantity	3	4	5	5	6	8
	Injector size	mm	1,00	1,00	1,00	1,15	1,20	1,15
		marking	100	100	100	115	120	115
	Burner pressure (1)	mbar	29,90	29,80	29,90	29,50	29,50	28,00
	Inlet pressure	mbar	30					

Hungary, Russian Federation, Ukraine

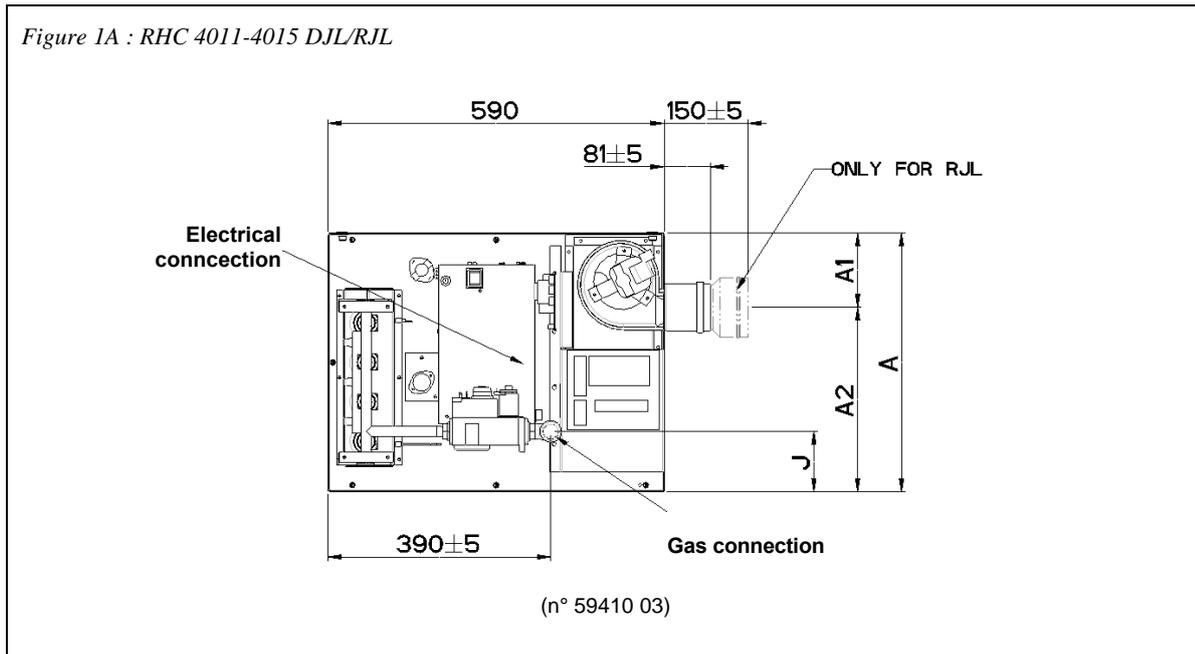
		Model	4011	4015	4018	4024	4030	4036
Nat. Gas G20	Injector	quantity	3	4	5	5	6	8
	Injector size	mm	1,85	1,85	1,85	2,20	2,20	2,20
		marking	185	185	185	220	220	220
	Burner pressure (1)	mbar	9,00	8,90	9,00	7,90	8,80	7,50
	Inlet pressure	mbar	20(*)					
Prop. Gas G31	Injector	quantity	3	4	5	5	6	8
	Injector size	mm	0,90	0,90	0,90	1,00	1,05	1,00
		marking	90	90	90	10	105	100
	Burner pressure (1)	mbar	49,90	49,50	49,70	49,80	49,60	48,30
	Inlet pressure	mbar	50					

(*) : Inlet pressure for Hungary = 25mbar

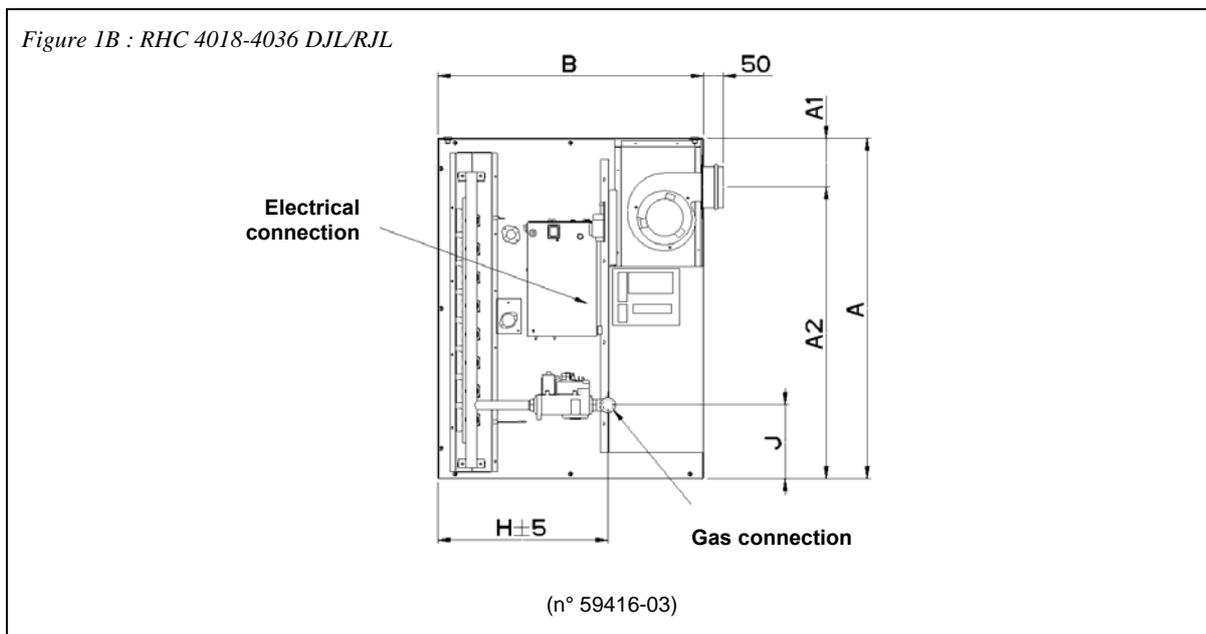
(1) : with open service door

2.2. MOUNTING FLANGE, DIMENSIONS & WEIGHTS

■ *Figure 1 : Dimensions side view (mm)*

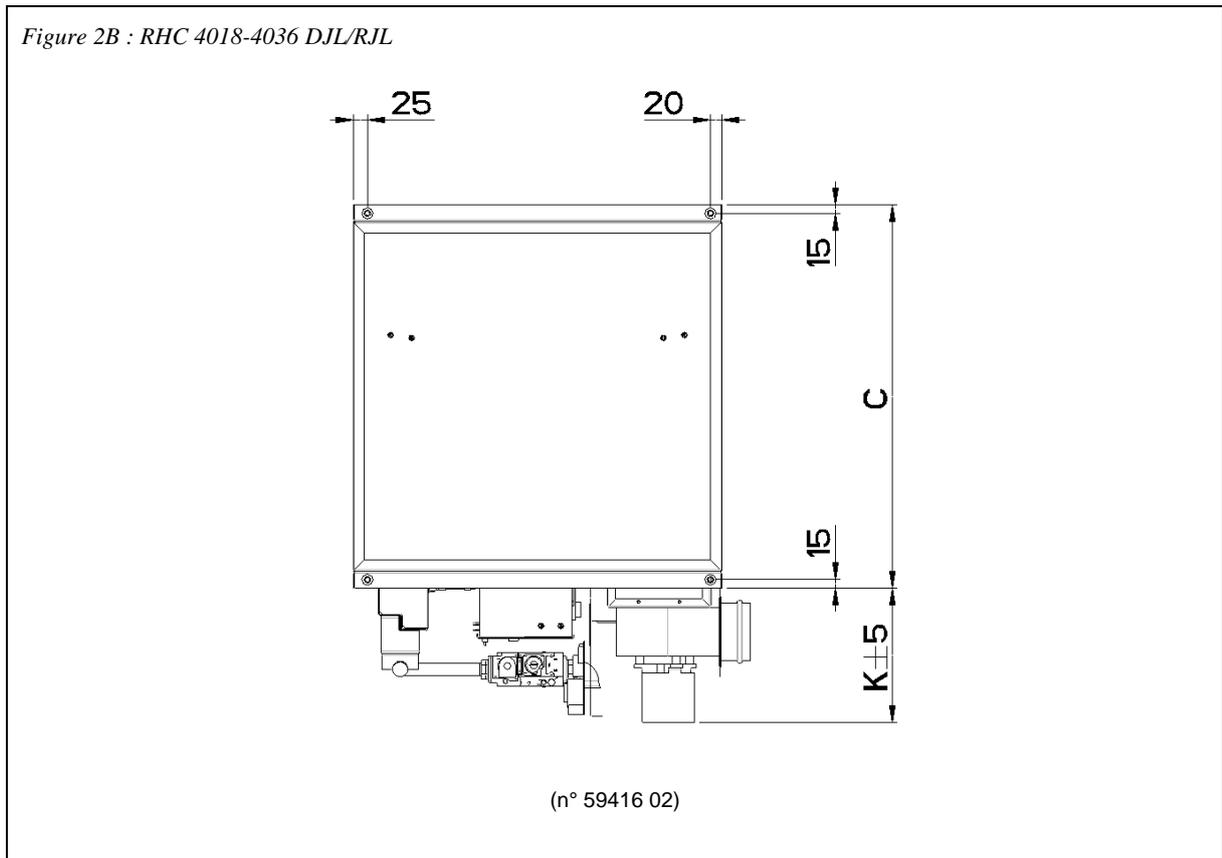
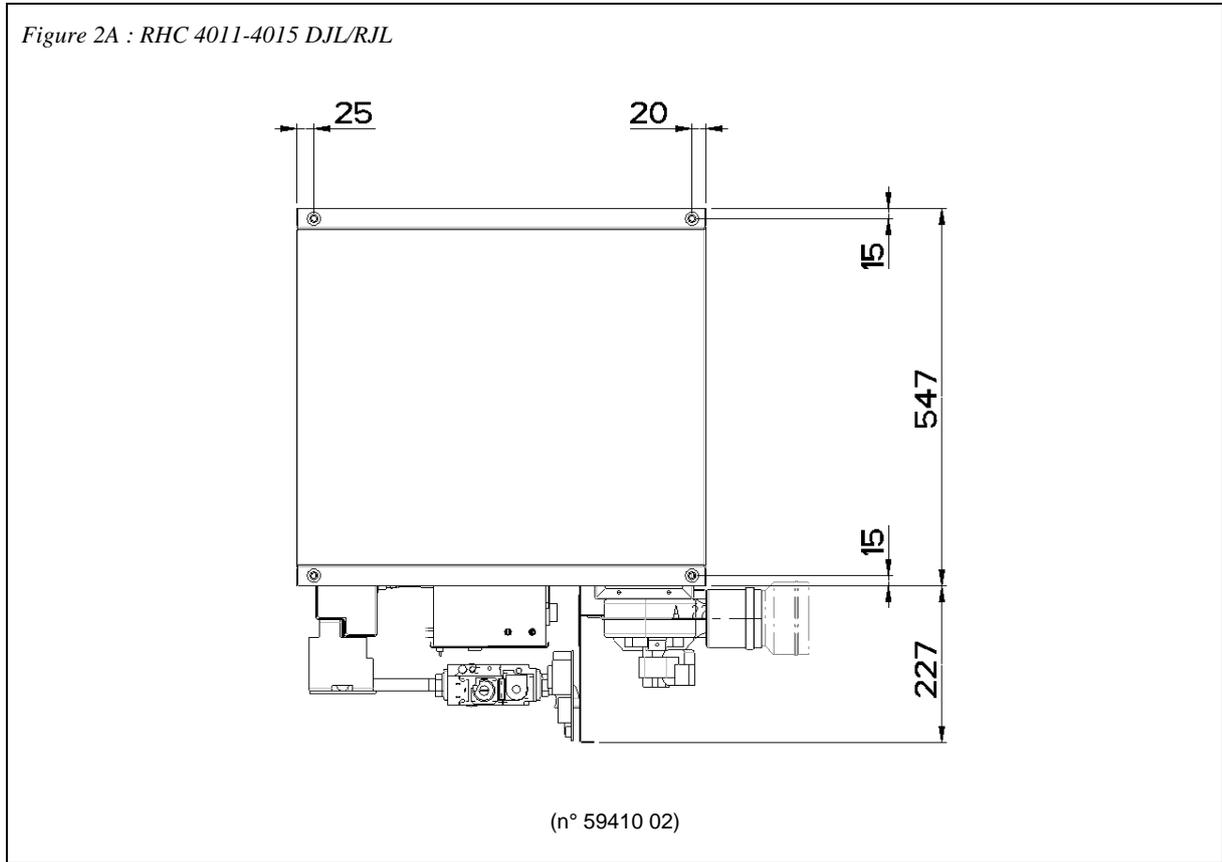


Type RHC	A	A1	A2	J
4011 DJL/RJL	305	131	174	100
4015 DJL/RJL	458	131	327	106

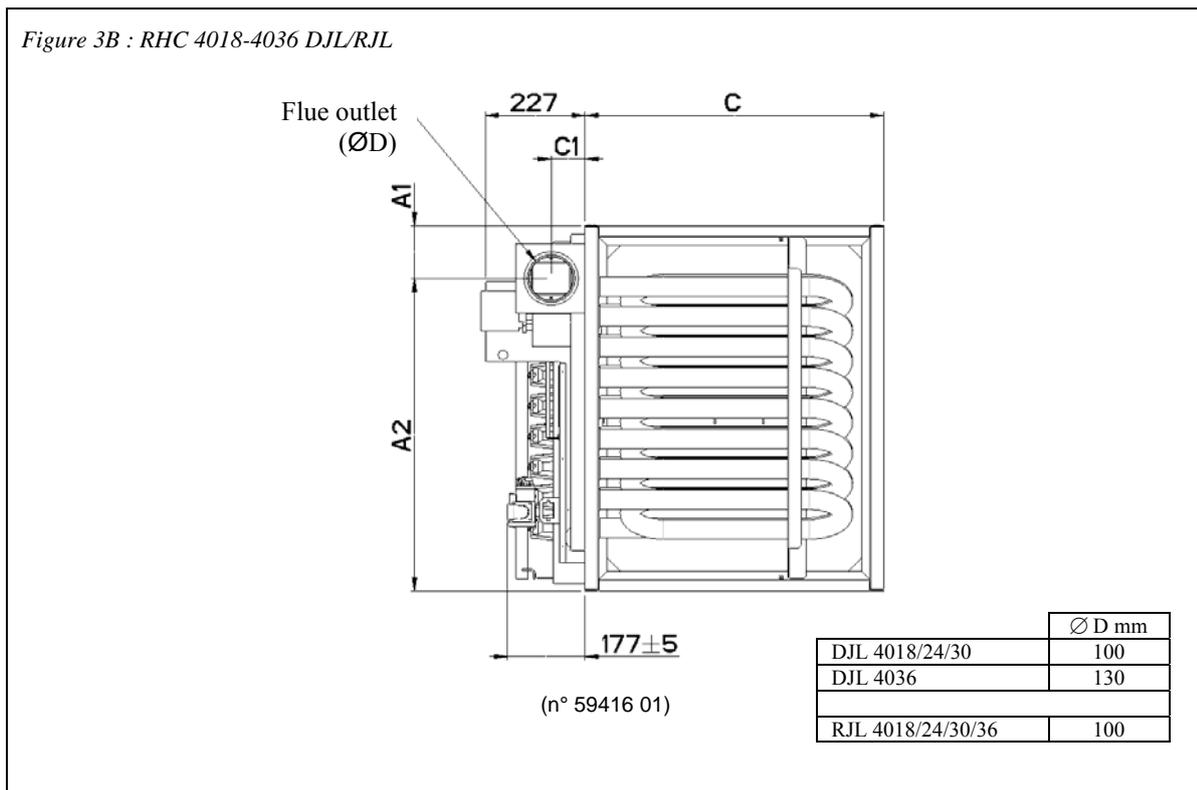
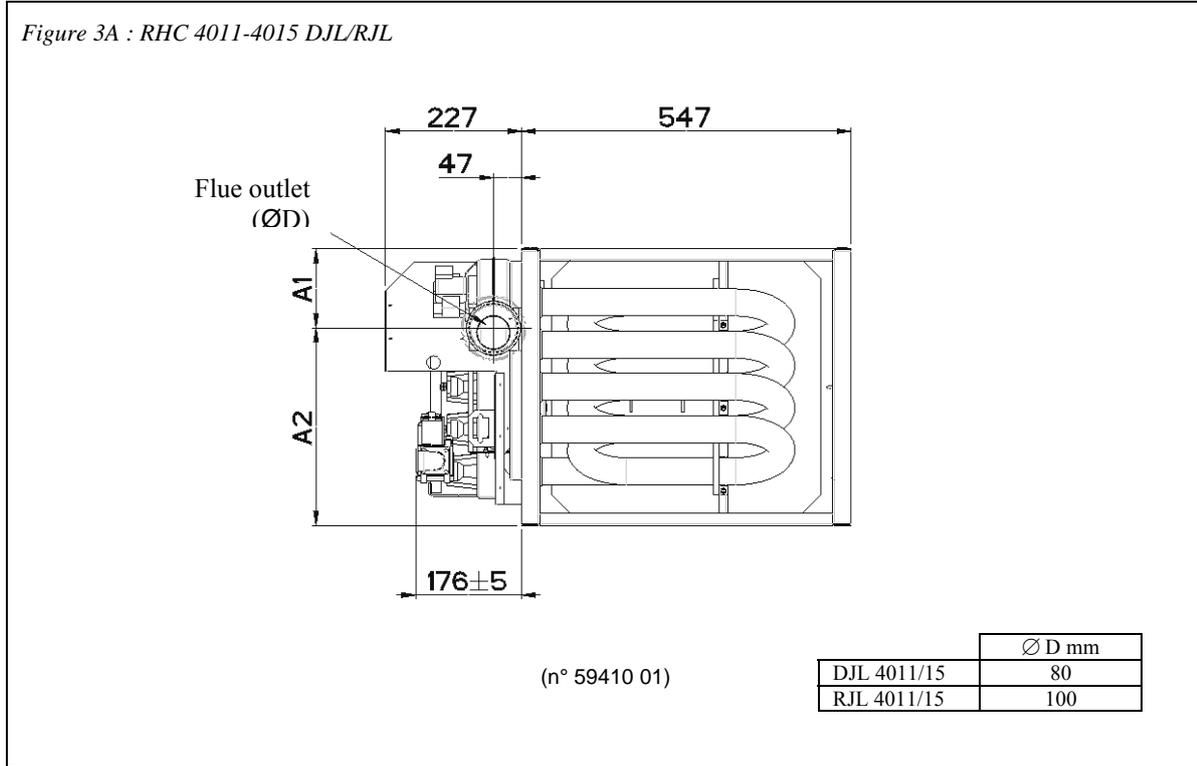


Type RHC	A	A1	A2	B	C	C1	H	J	K
4018 DJL/RJL	458	121	337	590	547	65	400	106	225
4024 DJL/RJL	559	121	438	648	677	65	425	112	225
4030 DJL/RJL	559	121	438	648	677	65	425	112	225
4036 DJL/RJL	837	121	716	648	677	80	425	181	230

■ **Figure 2 : Dimensions top view (mm)**



■ **Figure 3 : Dimensions back view (mm)**



■ **Weights (kg)**

Type	4011	4015	4018	4024	4030	4036
unit	20	25	30	31	33	52
packaging	12	14	14	18	18	23
total	32	39	44	49	51	75

3.0 GENERAL REQUIREMENTS

3.1 GENERAL

It is important that all gas appliances are installed in accordance with the rules in force and by appropriately qualified persons. Failure to install appliances correctly could lead to prosecution. It is in your own interest and that of safety to ensure compliance with the law.

CAUTION: Air heaters should not be installed in corrosive atmospheres, i.e. near plating or de-greasing plants or in areas where there is a fire risk.

Care should be exercised when designing ducting systems especially with regard to the application of restriction and direction turning fittings, i.e. elbows directly on to the air heater, doing so can cause an uneven and turbulent airflow across the heat exchanger resulting in heat exchanger spots and nuisance shut down of the gas burner due to regional overheating, thus activating thermal over-heat controls. The location must also provide sufficient space to allow the heater to be serviced.

3.2 SPECIFIC HEATER LOCATION

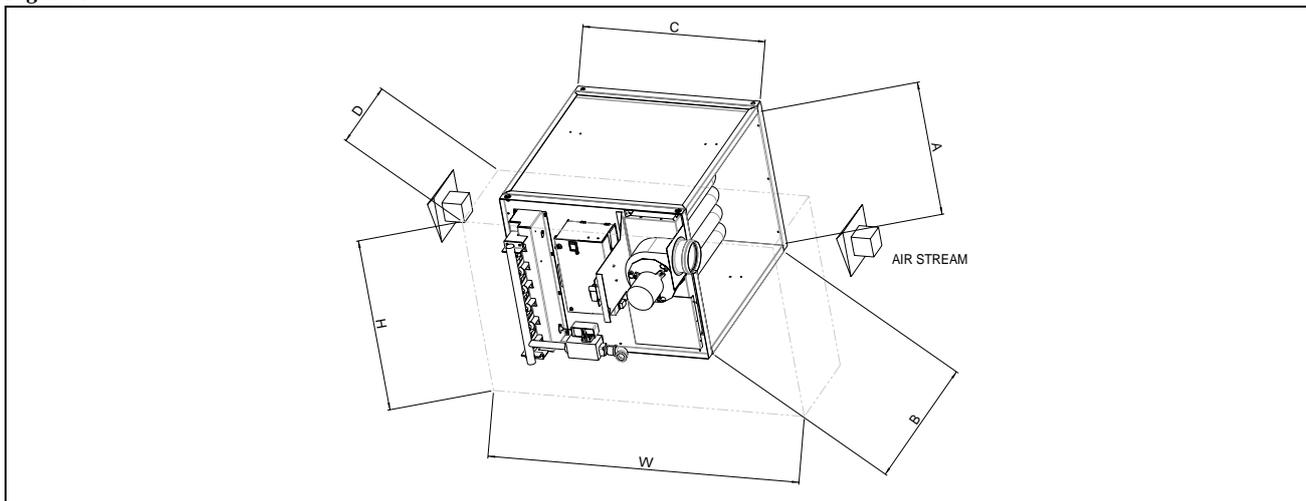
DJL installation :

Do not locate the air heater where it may be exposed to water spray, rain, etc.

The location chosen for the air heater must permit the provision of a satisfactory flue system venting to outdoor atmosphere and adequately ventilated to provide for combustion air.

3.4 COMPARTMENT DIMENSIONS

Figure 4



RHC ... DJL/RJL	A	B	C	D min	D max	H	W
4011	265	487	590	315	373	400	1100
4015	418	487	590	315	373	550	1100
4018	418	487	590	315	393	550	1050
4024	509	617	648	315	393	650	1100
4030	509	617	648	315	393	650	1100
4036	787	617	648	330	408	1000	1100

Table 3a : Installation clearances (mm)

RHC 40..DJL	11,15,18	24,30,36
Top	50	150
Flue connector	150	150
Access panel	500	600
Non-access side	50	150
Bottom	50	50

RJL installation :

A minimum distance of 1500mm must be maintained on the control side of the appliance.

When installed at ground level a fence to guard against damage and to protect the public from possible injury should protect the entire installation.

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

3.3 MINIMUM AIRFLOW REQUIREMENT (TABLE 3B)

The minimum airflow duty through the heating section enclosure (see figure 4) must be observed as indicated in table 3b

Table 3b

RHC 40..DJL/RJL	Min. air volume required (m ³ /h)
4011	1465
4015	1940
4018	2270
4024	2880
4030	3290
4036	5281

3.5 MAXIMUM AIRFLOW CONDITION

Special attention must be given to ensure that the temperature rise of the air, passing through the enclosure (duct channel) around the heat exchanger tubes, is high enough to avoid condensation forming within the tubes. This condensation forming could occur by super cooling of the products of combustion. Such condensation can be the source of severe corrosion and damage to tubes or part of the tubes.

The chart below indicates the probability of condensation forming within the tubes reference :

- the temperature rise of the air through the enclosure (around the tubes) (see figure 4)
- the inlet air temperature passing over the heat exchanger

In function of the expected minimum inlet air temperature, the minimum required temperature rise (to avoid condensation) must be derived from the chart shown below.

Example

- expected minimum inlet temperature = -5°C
- minimum required temperature rise shown on the chart = +13°C

Table 1 indicates the heat output (kW) of the different models.

The maximum allowable airflow [through the enclosure (duct channel) around the tubes] can be calculated as follows :

$$V_{\max} \text{ (m}^3\text{/h)} = \frac{\text{heat input (kW)} \times 1000}{\Delta T_{\text{minimum}} \times 0,3423}$$

Example :

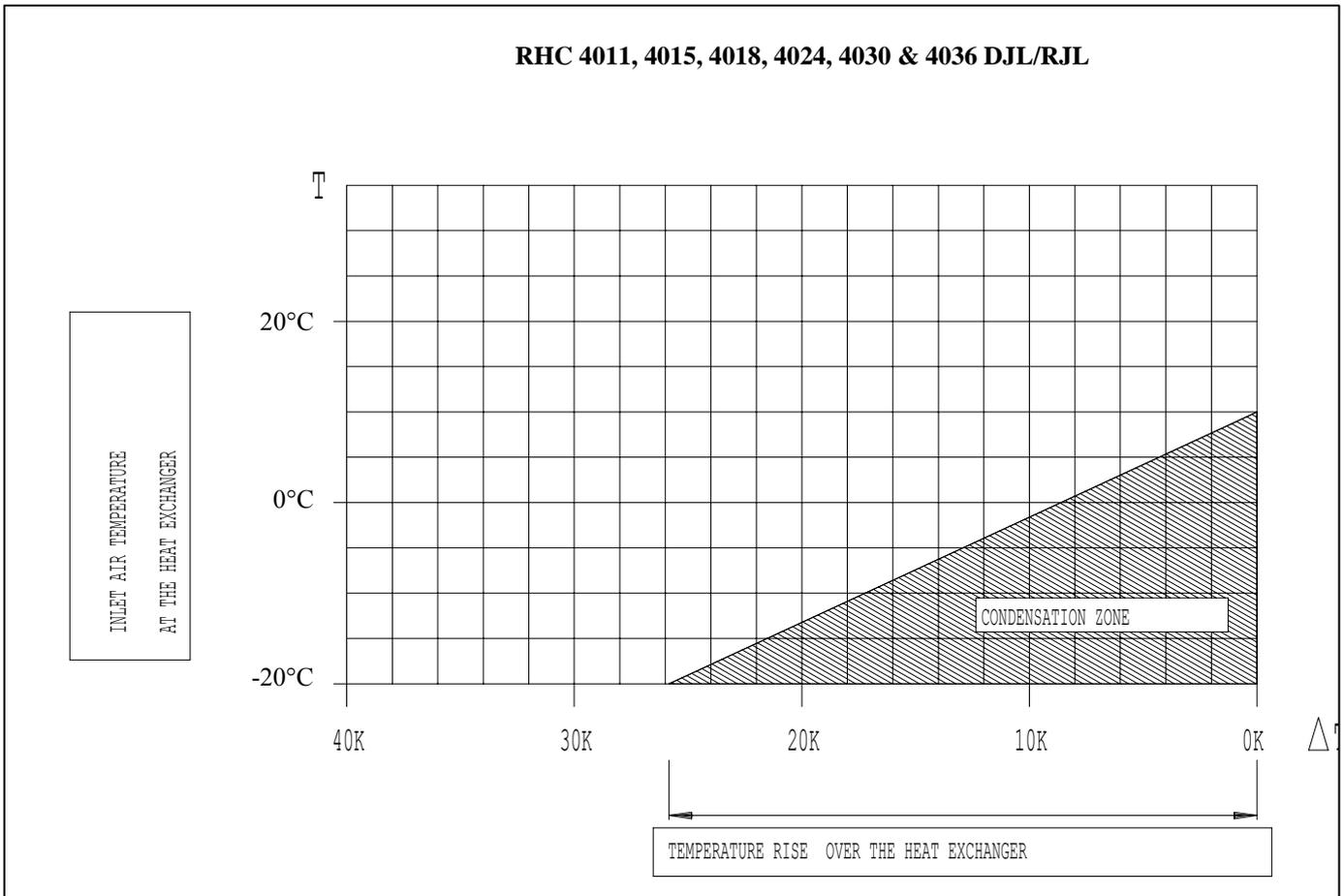
<T_{min} = 13K

model 4036 at 100% heat input : 35.80kW results into V_{max} = 8045m³/h

Remark :

For air heaters with the option 2 stage gas valve (50% minimum heat input) or the option modulating gas valve (30% minimum heat input) attention must be given to determine the maximum allowable airflow in function of the appropriate heat input

Figure 5 : Dew point occurrence chart (condensation zone)

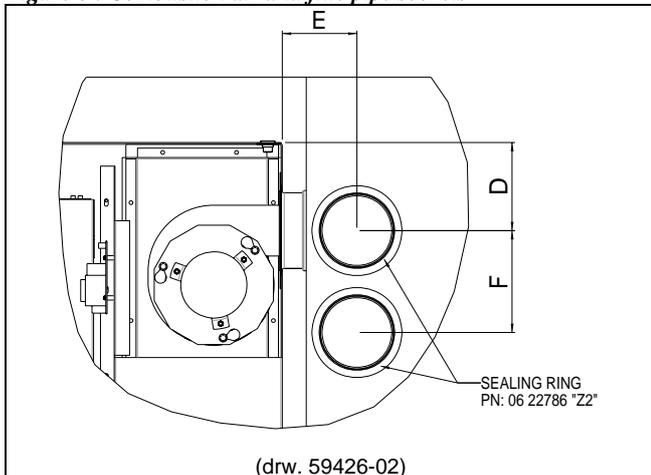


3.6 COMBUSTION AIR SUPPLY & FLUE SYSTEM

ATTENTION : this section only applies to DJL models !

The air heater 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 (Type B) heater, which requires only a flue pipe exhausting to outdoors. All products of combustion must be flued to outdoor atmosphere.

Figure 6 : Combustion air and flue pipe sockets



DJL (mm)	D	E	F
4011-4015	131	125	120
4018	121	105	140
4024-4030	121	105	140
4036	121	178	225

Each heater installed as a type B appliance must be fitted with an individual flue pipe and the combustion air inlet socket (IP20) (1). Each heater installed as a type C appliance must be fitted with an individual combustion air/flue pipe system. Only systems specified by the air heater manufacturer may be used.

Common flue and combustion air systems must not be used. **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.

- (1) dia 80 = PN 60 50733 080 (RHC 4011-4015)
- dia 100 = PN 60 50733 100 (RHC 4018, 4024, 4030)
- dia 130 = PN 60 50733 130 (RHC 4036)

3.6.1 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 the regulations & rules in force.

Table 4 shows flue pipe sizes and maximum vent lengths. The minimum flue length is 0.5 meters.

Table 4 Flue pipe diameters & maximum lengths

Model RHC 40.. DJL		11,15	18, 24,30	36
Heater socket & pipe dia	mm	80	100	130
Maximum straight length	m	7.5		
Equivalent length of 90° elbow	m	1.5		

Single wall flue pipes are required. All joints must be sealed to prevent products of combustion from leaking into the building. An approved flue terminal is required.

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 at least a 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 50 mm away from any combustible material.

Single wall flue pipe exposed to cold air or run through unheated areas must 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.

3.6.2 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.

Air heaters if fitted with a power venter permitting either a vertical or horizontal combustion air inlet/flue pipe system. The heaters must be installed with a concentric vertical or horizontal flue/air inlet. The heaters are only approved for use when installed with the appropriate approved concentric vent terminal. See table 5.

Both the flue and combustion air pipes must be sealed. Use gasket sealed seamless aluminum pipe or equivalent.

The flue pipe must include a re-sealable test port to allow good average sampling of the flue gas mixture for testing; the port must be at least 450 mm away from the air heater flue connection socket.

Follow any flue pipe manufacturers' installation instructions for making joints, including connections to the air heater, for passing through a building element and for support requirements. If more than one air heater is being installed in the same place each heater must have a separate flue system.

Table 5
Combustion air inlet & flue pipe requirements

Model RHC 40.. DJL		11,15	18,24,30	36
Heater socket & pipe dia (mm)	Flue pipe	80	100	130
	Inlet pipe	80	100	130
Max. straight length (m)	Flue pipe	9	9	9
	Inlet pipe	9	9	9
Equivalent length of 45 ° elbow (m)	Inlet pipe	0.75	0.75	0.75
	Flue pipe	0.75	0.75	0.50
Equivalent length of 90 ° elbow (m)	Flue pipe	1.5	1.5	1.5
	inlet pipe	1.5	1.5	1.5
Concentric vertical vent or wall terminal: types : Mugro/Burfix Ø80 - Mugro/Burfix Ø100 - Mugro/Burfix Ø130				
Concentric horizontal vent or roof terminal: types : Mugro/Burfix Ø80 - Mugro/Burfix Ø100 - Mugro/Burfix Ø130				

3.7 AIR SUPPLY

ATTENTION : this section only applies to DJL models !

It is important to ensure that there is an adequate air supply at all times for both combustion and heating requirements. Modern constructions involve the greater use of insulation, improved vapor barriers, and weather-proofing.

This practice means that buildings are sealed much tighter than in the past.

The combustion air supply for a power vented gas fired air heater (Type B installation) can be affected by lack of air supply. Natural infiltration may not be adequate. Use of extract fans aggravates this situation. It is important to ensure that there is an adequate air supply at all times. Reliance on doors and windows is not allowed. Always ensure that an adequate inlet for fresh air for combustion is provided sized to suit the total installation of any combustion apparatus.

Fit an access guard to the combustion air inlet and take appropriate action to ensure that it remains unblocked.

WARNING: This model air heater is installed as a type B application and is designed to take air for combustion from the space in which it is installed. Do not restrict the combustion air intake.

3.8 ELECTRICAL SUPPLY

Wiring external to the air heater must be carried out in accordance with the rules in force and by appropriately qualified persons.

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

A constant 230 volt 50 Hertz single phase with neutral link fused electricity supply is required. All heaters and controls must be earthed. A lockable isolator with contact separation of at least 3.0 mm on all poles should be installed adjacent to the appliance and within reach of any person working on the heater.

When a number of heaters are to be connected as part of a single installation each heater must be provided with a separate isolator.

Ensure that electrical supply cables do not touch the very hot combustion collector box. The cables must be fitted on the gas pipe inside the service compartment. The final connection must be made in the terminals provided in the control compartment. Follow the wiring diagram provided with the air heater.

Electrical supply cable conductor size should be 1.5 mm. Fit the cord grip supplied with the heater. The length of conductors between the cord grip and the terminals must be such that in the event that the cable becomes taut the line conductors do so before the earth conductor.

3.9 GAS SUPPLY (gas service connection Rc ¾)

RHC 4000 DJL/RJL heaters are designed to operate on either natural gas (G20) or propane (G31) / butane (G30) gas. Refer to the specifications in section 2 of this document and to the data plate for details of supply pressures.

The gas meter and gas service must be checked by the supply undertaking to ensure that they are adequate to deal with the total load of all gas fired apparatus installed.

Connection to a gas network may only be carried out by appropriately qualified persons. The gas installation must comply with the rules in force using materials appropriate for gas installation.

To facilitate servicing, the air heater must be fitted with an approved gas service tap and union fitting or union tap adjacent to the appliance.

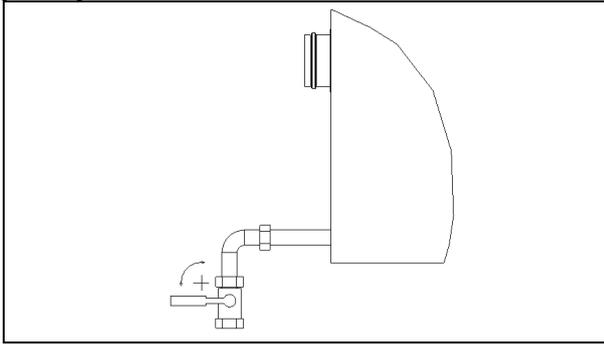
The inlet gas supply line must be installed so as to permit the access door to be opened and to allow removal of slide out burner assembly.

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

A 90° action, positive stopped gas service tap must be fitted adjacent to the appliance, fitted in a manner to facilitate appliance burner removal for service purposes, see figure 7. Ensure that the gas service includes a filter and has been tested and purged in accordance with prescribed practice prior to commissioning and taking the appliance into service.

As a rule, gas service pipes should not be routed through air ducts. Should it be necessary to do so then pipe work joints must not be made within the air duct.

Figure 7 : gas connection detail Rc 3/4



4.0 INSTALLATION

4.1 UNPACKING AND PREPARATION

Prior to dispatch, the air heater was operated and tested at the factory.

Check the shipping label and data plate to ensure the specification of gas and electrical supplies are compatible. Read this document and become familiar with the installation requirements and the appliance before commencing installation.

4.2 FITTING THE COMBUSTION AIR INLET/FLUE SYSTEM

ATTENTION : this section only applies to DJL models !

Flue pipe runs may be horizontal or vertical and terminate either through the wall or roof. See table 4 for maximum vent length for an appliance installed as type B or table 5 for maximum lengths and approved supplied concentric terminals for a heater installed as a type C appliance.

4.2.1 Fitting the flue pipe

Flue pipes must be sealed. Use seamless, aluminum pipe or equivalent. Follow pipe manufacturer's instructions

Table 6 : Flue pipe socket size (Ø mm)

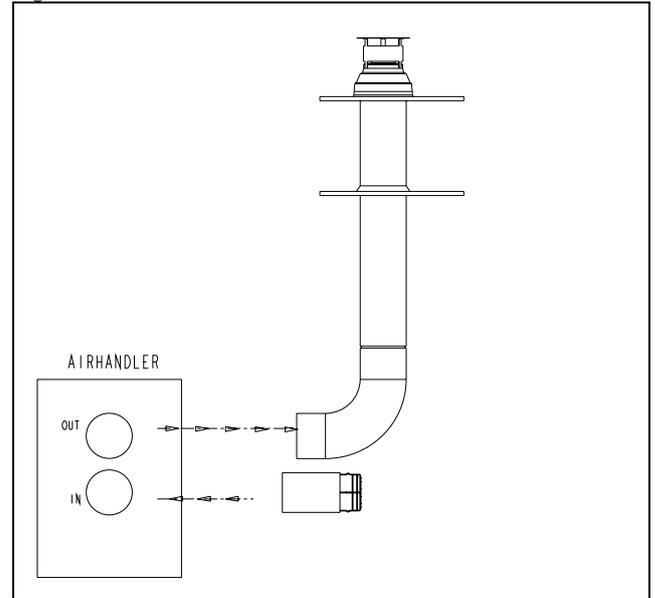
RHC 4000. DJL	11,15	18/24/30	36
Socket	80	100	130

4.2.2 Installing a guard on the combustion air inlet pipe for power vent (Type B installations)

When installed as a type B appliance, protect the inlet by fitting an access guard on the socket. **Do not block this socket as it supplies combustion air for the burner**

The inlet must be provided with a protection grill IP20 (see figure 8a).

Figure 8a :



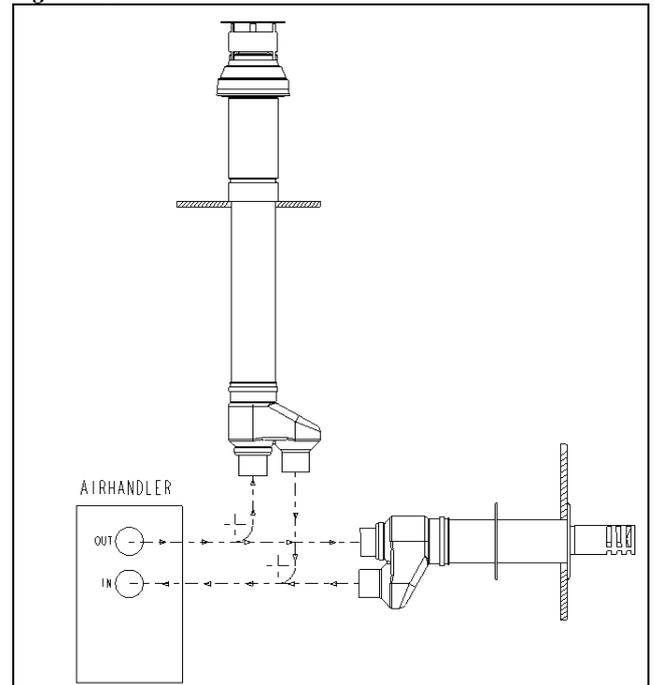
4.2.3 Fitting the combustion air inlet pipe for balanced flue (Type C installations)

The combustion air pipe attaches directly to the inlet socket. Air inlet pipes must be sealed. Use seamless aluminum or equivalent. Follow the pipe manufacturer's installation instructions. See typical installations in figure 8b.

Table 7 Air inlet socket size (Ø mm)

RHC 4000.DJL	11,15	18,24,30	36
Socket	80	100	130

Figure 8b :



4.3 ELECTRICAL CONNECTIONS

The electrical installation may only be carried out by appropriately qualified persons observing the rules in force. 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 or included with this document.

DANGER: THIS APPLIANCE MUST BE EARTHED

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

An indicator light and burner-reset button are fitted inside the appliance. 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 should be identified before resetting. After resetting stay with the appliance for long enough to ensure that lockout does not reoccur (suggest 5 minutes).

4.4 ROOM THERMOSTAT SITING

The siting of the room thermostat is important. It should not be fitted on an outside wall.

Avoid location in draughty areas or where it may be influenced by heat sources e.g. the sun, process plant, etc. The thermostat or temperature sensor should be mounted on a vibration free surface and mounted about 1,5 meters above floor level. Follow the thermostat manufacturers fitting instructions. The thermostat must be suitable for switching 230 volts. **Do not attempt to control more than 1 air heater from a room thermostat or control panel unless a properly wired relay is fitted. Follow instructions supplied with such panels.**

5.0 COMMISSIONING & TESTING

Appropriately qualified persons may only carry out the commissioning and testing.

This section should be read and fully understood before commencing commissioning and testing.

5.1 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 that electrical cables/wiring do not touch the 'hot' combustion collector box and fix them all on the gas pipe.
- * Check that all wiring is connected in accordance with the appliance circuit diagram.

- * Ascertain that the correct fuse value and cable size has been provided.
- * Check to ensure that the appliance is earthen by conducting an earth continuity test. Connect a test meter, one lead to the appliance earth terminal and the other to the mains incoming earth point at the electrical isolator. A resistance reading of 1,0 ohm or less must be indicated. If a higher reading is obtained, check all cable connections to ensure adequate security and cleanliness. If problem still exists it may be necessary to consult the electricity supply undertaking.
- * Carry out a polarity test. Connect one lead of a suitable AC voltmeter to earth and connect the other lead to the live supply terminal (L) at the air heater. Switch ON the power to the air heater and check for correct voltage. The same result should be obtained by connecting the test leads between live and neutral. Connect the voltmeter test leads to N and E. A reading of $\pm 0V$ should be obtained. If these tests do not conform to the above, there is a fault, which must be rectified before proceeding further with the commissioning.
- * Check that a suitable thermostat or control panel has been fitted.
- * Ensure that an electrical isolator with two-pole separation with a minimum air break between poles of 3,0 mm has been fitted adjacent to the air heater.

5.2 GAS CONNECTION

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

The whole of the gas service installation including the meter must be inspected, tested for soundness and purged in accordance with appropriate requirements by a qualified person.

CAUTION: Never use a flame for checking gas soundness.

5.3 LIGHTING THE AIR HEATER

RHC 4000 DJL/RJL air heaters are all fitted with automatic spark ignition systems. When adequate airflow for combustion is proven by an air proving control and a pre-purge period has elapsed, the integral igniter and multi-functional gas control operate. The ignition spark ignites the gas creating the burner flame, which is detected by a flame rod sensor. If a burner flame is not detected, the ignition controller proceeds to lockout and requires manually resetting. Lockout is indicated by the red warning light on the air heater.

NOTE: If the first reset is not successful, wait 15 seconds before attempting reset.

5.3.1 To turn the air heater "ON"

The following checks should be carried out before attempting to light the air heater.

- * Ensure that the gas supply to the air heater is turned ON;
- * Ensure that the electrical supply to the air heater is switched ON;
- * If fitted ensure that a time switch is set to an ON period;
- * Set room thermostat to call for heat. e.g. above room ambient temperature (see air handling system);
- * Adjust the room thermostat to the required operating comfort temperature. The air heater will now start automatically when the room thermostat calls for heat,

NOTE:

If the air heater will not start on initial start-up, the ignition controller may be in lockout position and require resetting. This may occur especially if the appliance has been on stand-by for a prolonged period.

5.3.2 To turn the air 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 (or follow the instructions of the air handler).

5.3.3 To turn the air heater "OFF" for long periods

Adjust the room thermostat to OFF or its lowest setting. When the fan has stopped, turn OFF the gas supply and then switch OFF the electricity supply to the air heater (or follow the instructions of the air handler).

5.4 AIR HEATER GAS PIPE WORK

The soundness of the air heater pipe work has been checked prior to leaving the factory. However during installation, connections may have been loosened. Check the soundness of the appliance pipe work using a soapy solution. If any leaks are found they must be rectified immediately.

Caution: Never use a flame for testing for gas soundness

5.5 ADJUSTMENTS

Burner gas pressure adjustment

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

- * Ascertain from section 1 of this document and the appliance data plate the correct operating gas pressure for the air heater;
- * Turn the room thermostat control to its lowest setting (see instructions of the air handler);

- * Remove the screw from the outlet pressure test point of the multi-functional control valve. Connect a manometer to the test point;
- * Adjust the room thermostat to call for heat e.g. above room ambient temperature;
- * Observe the burner gas pressure on the manometer and compare to the required pressure (on/off system : tables 2A/2B);
- * If necessary, adjust the burner gas pressure. Remove the cover screw (Honeywell application) or cover cap (Sit application). Turn the regulator screw anti-clockwise to decrease pressure or clockwise to increase pressure;
- * Set room thermostat to lowest setting to turn OFF the burners. Replace the test point screw (if removed) and with the main burner alight, test for gas soundness using a soapy solution.
Reset temperature control/room thermostat to comfort operating level;

Figure 9a : SIT gas valve

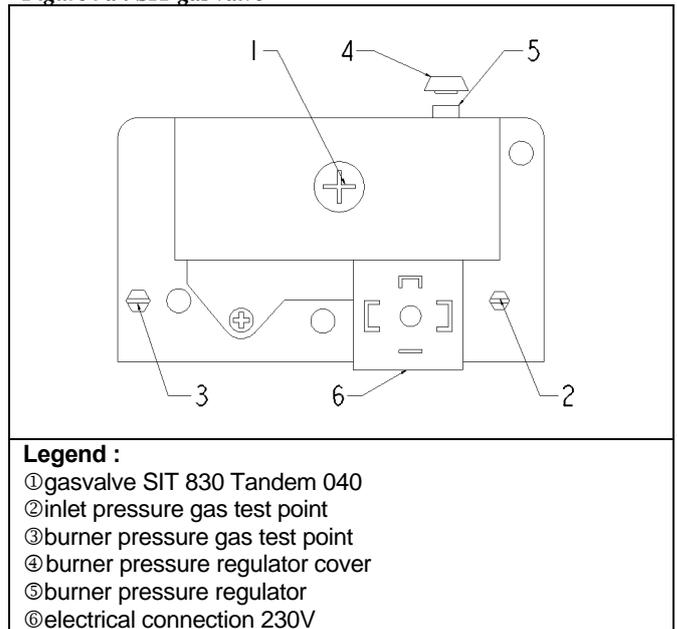
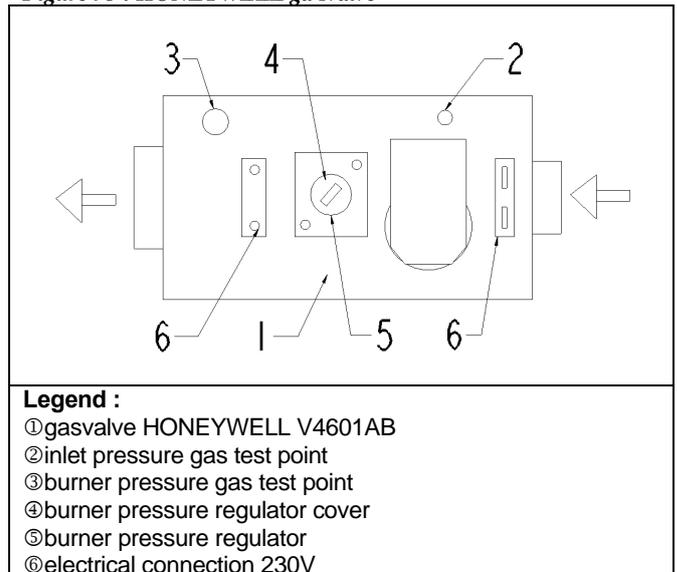


Figure 9b : HONEYWELL gas valve



5.6 OPTIONS

5.6.1 Two-stage burner control

Description

This option provides a 2-stage burner control system providing 100% & 50% heat input. Appliances so equipped will only operate in a two-stage manner when connected to a two-stage external control (room thermostat) or duct stat.

Important

Safe operation of the burner is only assured when the low rate setting is 50% or greater than the high rate setting. The low rate gas setting pressure should therefore never be less than 25% of the normal high rate setting pressure (refer to table 8).

Nomenclature

This option may only be used in conjunction with appliances fitted with Honeywell multi-functional gas controls types VR 4601P.. or type V 4600P.. The valve operator V 4336A.. 3/20 for natural gas or V 4336A..4/37 for propane gas may be used to replace the single stage gas regulator already fitted if conversion is being undertaken.

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

Note:

The maximum gas pressure for all gas type is 60 mbar.

Care should be taken when handling the operator for the purpose of replacement or exchange.

If upgrading of an existing single stage valve is being carried out then the gas valve must be marked accordingly to ensure that replacement parts for the future are readily identified.

Figure 10 shows in outline view the valve operator and indicates its principal components.

Field adjustment & checkout

Important

1. Fitting and adjustment may only be carried out by qualified persons.
2. Allow time for pre-set pressure to stabilize before making adjustments i.e. 1 minute.
3. Operate high-low regulator a few times after adjustment to ensure correct setting.
4. Remove cover cap as indicated in figure 10

Setting (refer to figure 10)

- lever off cover cap as indicated.
- before commencing an adjustment connect a manometer to the burner pressure test point.
- maximum high rate setting **must** be adjusted first after which the minimum low rate setting can be adjusted. Any adjustment of the maximum setting influences the minimum rate setting.
- do not adjust maximum or minimum settings above or below the pressure stated on the data plate or in table 8.

Adjusting maximum pressure

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

Adjusting minimum pressure setting

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

Note :

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

Figure 10: V 4336A.. Gas valve operator

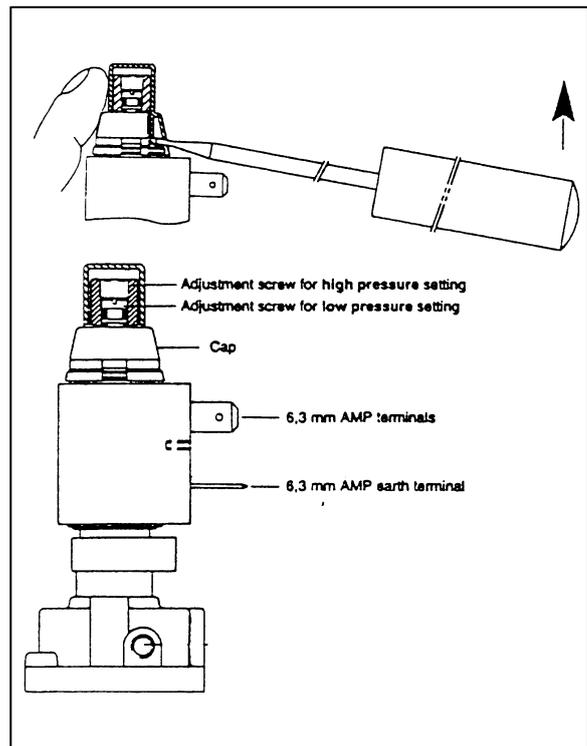


Table 8 : Models High/Low burner gas pressures and low rate consumption values

RHC 40..DJL/RJL			4011	4015	4018	4024	4030	4036	
Burner pressure	Pressure at 100%	nat gas G20	mbar	9.00	8.90	9.00	7.70	9.20	7.00
		butane G30	mbar	27.90	27.80	27.80	28.70	27.50	27.30
		propane G31	mbar	36.90	36.80	36.90	36.50	36.50	36.00
	Pressure at 50%	nat gas G20	mbar	2.25	2.23	2.25	1.93	2.30	1.75
		butane G30	mbar	6.98	6.95	6.95	7.18	6.88	6.83
		propane G31	mbar	9.23	9.20	9.23	9.13	9.13	9.00
	Pressure at 30%	nat gas G20	mbar	0.81	0.80	0.81	0.69	0.83	0.63
		butane G30	mbar	2.51	2.50	2.50	2.58	2.48	2.46
		propane G31	mbar	3.32	3.31	3.32	3.29	3.29	3.24
Gas consumption at 50% ¹ Reference 15°C/1013mb	natural G20	m³/h	0.63	0.84	1.05	1.40	1.75	2.10	
	butane G30	kg/h	0.48	0.64	0.80	1.07	1.34	1.61	
	propane G31	kg/h	0.47	0.63	0.79	1.05	1.31	1.57	

¹ Natural gas G20 gross calorific value 10.48 kWh/m³ at 15°C & 1013 mbar
 Propane gas G31 gross calorific value 14.0 kg/h
 Butane gas G30 gross calorific value 13.70 kg/h
 Low fire rate must not be reduced below the values stated above for 50% rating.

Note :

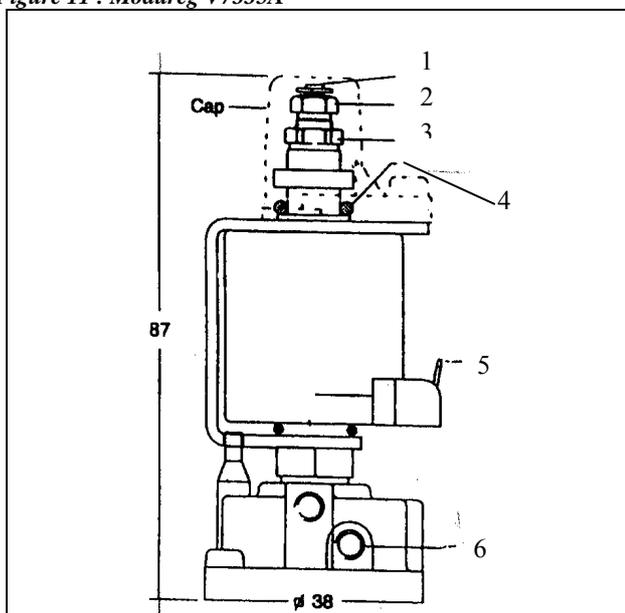
Burner pressures for butane/propane gasses are approximate based on regulated supply pressure :

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

Example : type 4030, 75%, prop.gas G31: 36,4 mbar x 0,75² = 20,48 mbar

5.6.2 Modureg V7335A 2000 series modulation system

Figure 11 : Modureg V7335A



Legend :

- 1 : Shaft
- 2 : Adjustment screw (7mm) for maximum pressure setting
- 3 : Adjustment screw (9mm) for minimum pressure setting
- 4 : "O" ring
- 5 : 6.3mm AMP terminals
- 6 : M5 pressure feedback connection

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

Caution:

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

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

Adjusting the V7335A Regulator

Refer to figure 11.

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

Fit a manometer to appliance burner pressure test point.

Important : allow time for gas pressure to stabilise before making adjustments.

To Set Minimum (low fire) 50% or 30% rate (cfr table 8)

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

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

To set Maximum (high fire) 100% rate

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

Fault finding “MODUREG” operation :

Follow setting procedure for fault finding

1. Minimum or Low Fire unobtainable :
 - Ambient temperature too high in location of regulator max 70°C;
 - Check input voltage to coil,
Zero volt is low fire mode, shaft out;
2. Cannot obtain Maximum or High fire :
 - Open circuit to regulator coil;
Measure coil resistance = 127 Ω;
 - Short circuit between coil and casing;
Check resistance between one terminal and casing, reading indicates short circuit;
 - Low voltage to regulator;
Check for correct voltage range, should be: 0 - 24 V DC;
 - Low gas supply pressure;
Check natural gas GB = 17.5-20.0 mbar. Push down plunger, burner pressure should rise to high-fire rate;
3. Erratic operation:
 - Fluctuating or pulsating DC voltage ;
 - Check using meter, if pulsating suspect input signal, transients, etc ...
4. Minimum rate lower than setting required or below 1.5mbar :
 - Minimum pressure set too low; re-adjust;
 - Line supply gas inlet control regulator faulty or requires adjustment;
Appliance gas tap not fully open

5.7 AIR HEATER CONTROLS AND OPERATION

Check air heater operation after all adjustments have been carried out. Set the temperature control above ambient temperature.

RHC 4000 air heaters are fitted with a pressure sensitive, combustion air safety control that monitors pressure differential if the combustion airflow. The control operates with the settings given in table 9 (settings are for sea level installations)

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

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

Table 9 : Combustion air pressure control settings

Model	Normal equilibrium warm (Pascal)	Set point 'off' (Pascal)
4011	95	68
4015	90	68
4018	180	130
4024	178	130
4030	180	130
4036	176	130

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

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

5.8 HANDING OVER

Upon satisfactory completion of commissioning and testing, hand the instructions to the user or their representative. Advise the appropriate person how to safely use and operate the air heater and describe the use of appropriate external controls. Ensure that the person understands how to start the heater and how to turn it OFF.

Suggest that the instructions are placed close to the air heater for future reference. In the absence of an appropriate location fix them to the gas service meter. Ensure they are not placed where they may restrict the airflow from the heater or where they may catch fire from a hot surface. **Do not fix them in the control section.**

Advise the person who is resuming responsibility that for continued safe operation the air heater should be serviced at least once a year.

6.0 SERVICING INSTRUCTIONS

IMPORTANT: Only appropriately qualified persons may carry out servicing and faultfinding on this gas fired equipment.

Before commencing service ensure that both the gas and the electricity are turned and switched "OFF" and that the air heater has cooled down.

Inadvertent substitution or replacement of components similar to those specified or replacement in a manner contrary to the method herein described could constitute a hazard and lead to prosecution.

Reznor RHC 4000 air heaters will operate with a minimum of maintenance. To ensure long life and satisfactory and safe performance, an air heater that is operated under normal conditions should be inspected and cleaned at the start of each heating season. If the air heater is operated in an area where unusual amounts of dust, etc are present in the air, more frequent servicing is recommended.

When any service is completed, be sure that components are reassembled correctly to ensure that no unsafe condition exists.

Upon completion of the service carry out the commissioning instructions outlined in section 5 of this document.

WARNING: Excessive dirt build-up on the inside of the burner ports could cause unburned gas to spill out of the back of the burner tube causing a fire or explosion. To prevent this occurring, clean all of the burner ports at least annually.

CAUTION: When cleaning air heaters, wearing of eye protection and a dust facemask is recommended.

6.1 SERVICE PROCEDURE

The following procedures should be carried out at least annually:

1. Remove the burner assembly as in section 7.1. Clean thoroughly, (cleaning the burners requires an emery cloth, wire brush and a cleaning cloth -stubborn deposits on burners are best cleaned using "acetone" as a solvent).
*Check the condition of the igniters and clean to remove all deposits. Check the spark gap (3,0 mm).
*Check the sensor - clean as necessary.
*Remove any soot deposits from the burner with a wire brush. Clean the ports with a degreaser or acetone. A vacuum cleaner or compressed air may assist in this cleaning operation. Wipe the inside of the burner tube clean (cleaning thoroughly with a degreaser as recommended will retard future build-up of dirt).
Inspect the burner for any damage or deterioration. If the burner is damaged or corroded, replace it.
2. The heat exchanger should remain clean unless a problem has developed due to poor combustion. Examine the heat exchanger tubes internally and externally for any sign of deterioration. The outside of the tubular heat exchanger can be cleaned from the front of the heater with an air jet and/or a flexible brush. Remove any dust and grease deposits.

The inner surfaces of the heat exchanger can be reached for cleaning with the burner and combustion air fan (venter) assemblies removed, (see figures 12 & 13 and section 7). Clean with a flue brush or a heavy wire to which wire wool has been attached. Brush inside each heat exchanger tube until all foreign material has been removed. The use of a flashlight is necessary to carry out this operation.

3. Remove any dirt and/or grease that may have accumulated on the venter fan motor and its housing.
NOTE: Venter fan motors are lubricated for life and do not require greasing.
4. The gas multi-functional control valve requires no field maintenance except cleaning of its exterior and checking the condition of the wire connections. Instructions for testing pressure are given in section 5.5.
5. Check the flue/combustion air system for soundness. Reseal/replace any parts that are not sound.
6. Check all wiring connections. Check wiring for any signs of damage. Replace any suspect wiring with an equivalent specification.
7. Check operation of thermal fan control and control relay.
8. When service is complete carry out full commissioning procedure as per section 5 of this document.

7.0 REMOVAL & REPLACEMENT OF PARTS

RHC 4000 air heaters must only be fitted with Reznor authorized replacement parts. These heaters must use certificated spare parts to comply with legislation.

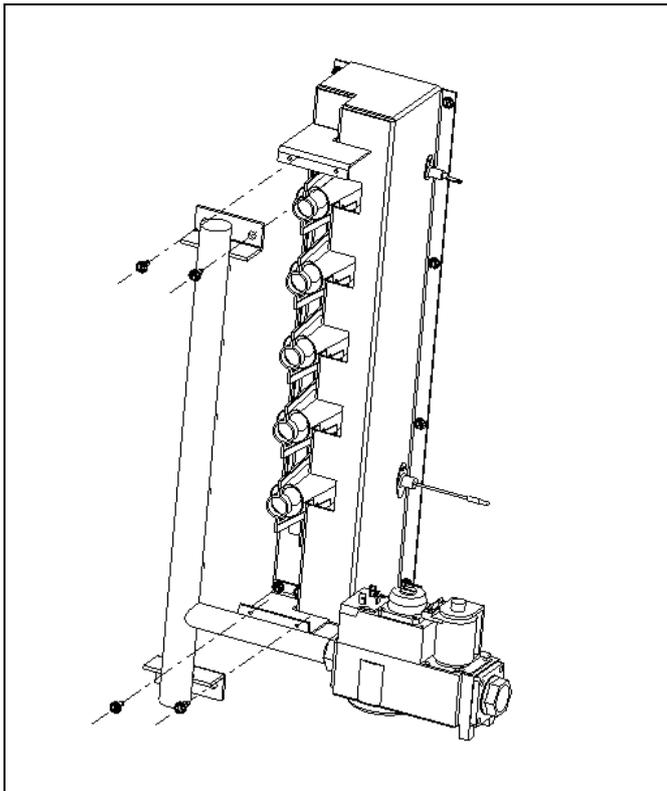
7.1 MAIN BURNER REMOVAL

1. Turn OFF the gas supply to the air heater.
2. Switch OFF the electricity supply to the air heater.
3. Open the access door.
4. Disconnect the union in the gas supply outside of the appliance.
5. Remove gas supply pipe from multi-functional gas control valve – remove flame sensor wire from flame sensor & high tension ignition wire from burner relay.
6. The burner rack assembly is now visible.
7. At the bottom of the burner rack assembly, remove the nut that secures the burner rack to the bolt welded to the burner box bottom. At the top of the burner rack assembly, remove the bolt that attaches the burner rack assembly to the bracket. Lift the burner rack/manifold assembly upward (to clear the locating weld pins) and pull the assembly out of the air heater.

Figure 12

Removing the burner rack/manifold assembly

For clarity, the heater cabinet & other parts are not illustrated; do not remove the burner box assembly from the heater



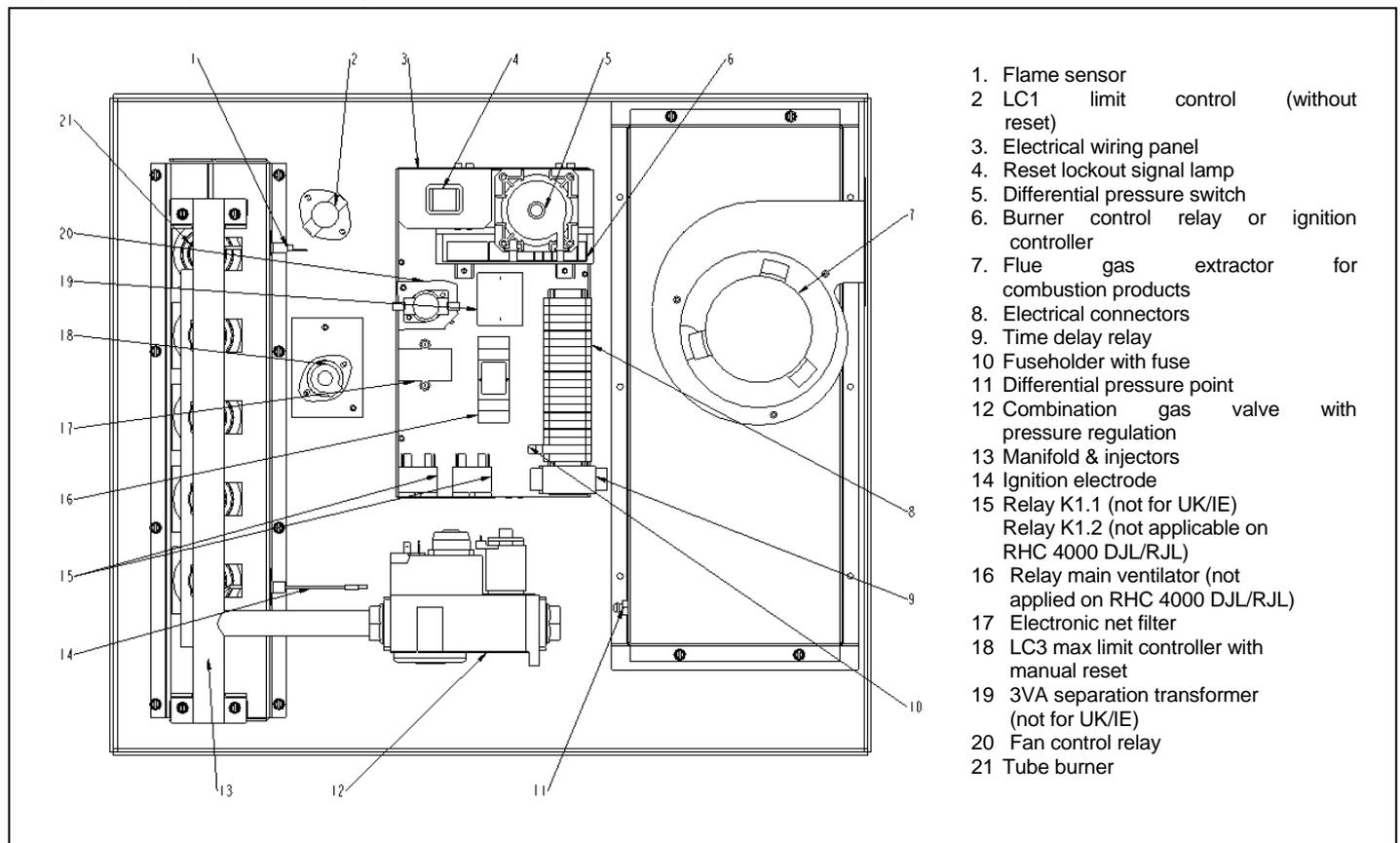
Instructions for re-assembly:

1. Reverse the procedure for removal making sure that all parts are installed correctly. Check that all components are secure.
2. When lighting, always follow the lighting instructions on the air heater.

Remember!

After any service work has been carried out, the air heater must be fully commissioned. See section 5 of this document.

Figure 13 : View of the Control Compartment



1. Flame sensor
2. LC1 limit control (without reset)
3. Electrical wiring panel
4. Reset lockout signal lamp
5. Differential pressure switch
6. Burner control relay or ignition controller
7. Flue gas extractor for combustion products
8. Electrical connectors
9. Time delay relay
10. Fuseholder with fuse
11. Differential pressure point
12. Combination gas valve with pressure regulation
13. Manifold & injectors
14. Ignition electrode
15. Relay K1.1 (not for UK/IE)
Relay K1.2 (not applicable on RHC 4000 DJL/RJL)
16. Relay main ventilator (not applied on RHC 4000 DJL/RJL)
17. Electronic net filter
18. LC3 max limit controller with manual reset
19. 3VA separation transformer (not for UK/IE)
20. Fan control relay
21. Tube burner

7.2 BURNER INJECTORS

1. Carry out steps described in section 7.1.
2. Unscrew the main burner injectors.
3. Re-fit new injectors.
4. Re-assemble in reverse order.

7.3 IGNITION SYSTEM

To access the ignition system, follow steps 1 to 3 in section 7.1.

Igniter - refer to figure 13 and locate the igniter (on the side of the burner rack). Disconnect the wire, remove the screw and the igniter. Clean with an emery cloth.

Note: Spark gap must be maintained to 3.0 mm See figure 14a.

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

We refer to figure 14b for installing the igniter.

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

Flame sensor - Refer to figure 13 and locate the flame sensor. Disconnect the wire, remove the screw and the flame sensor. Clean with an emery cloth.

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

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

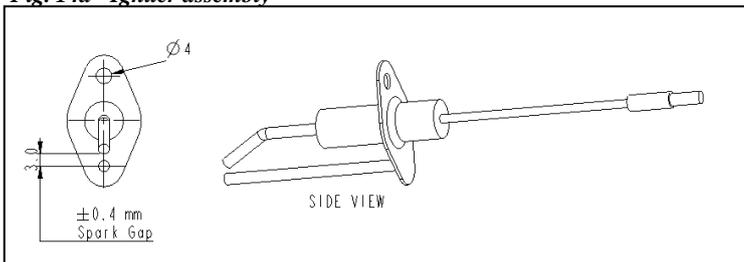
For further information and checkout procedure of the direct spark ignition system, refer to the manufacturers control operating instructions a copy of which is supplied with the air heater.

7.4 MULTI-FUNCTIONAL GAS CONTROL VALVE

1. Ensure gas supply to the air heater is turned OFF.
2. After the air circulation fan has stopped, switch OFF the electricity supply to the air heater.
3. Mark for future identification and disconnect the wires connected to the valve.
4. Disconnect the gas service union between the control valve and the gas service tap. Remove the gas control valve.
5. Re-fit a replacement valve making all of the required connections.
6. Carry out complete commissioning procedure prior to placing the appliance back into service as outlined in section 5.0.

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

Fig. 14a - Igniter assembly



7.5 THERMAL OVERHEAT (LIMIT) CONTROLS

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

To gain access to the control, open the hinged controls compartment access door. Refer to figure 13 for control locations. The control near the top of the air heater is a disc type control. The lower one is a capillary type one with a capillary tube that extends into the heat exchanger area.

To remove the controls, disconnect the wires leading to them, remove the fixing screws and lift clear of the inner-casing panel.

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

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

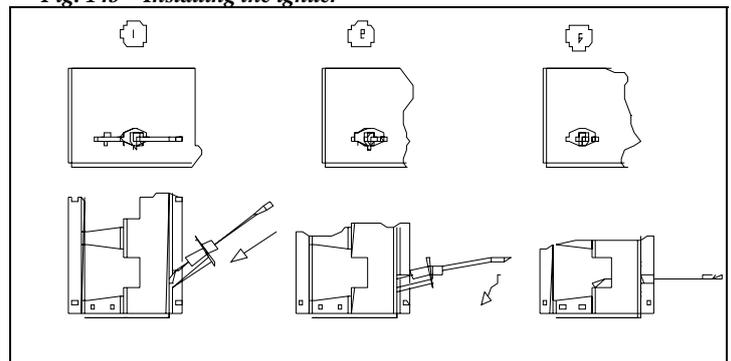
7.6 COMBUSTION AIR CONTROL PRESSURE SWITCH

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

7.7.COMBUSTION AIR FAN (VENTER)

1. Ensure gas supply to the air heater is turned OFF
2. After the air circulation fan has stopped, switch OFF the electricity supply to the air heater.
3. To gain access to the fan open the controls compartment access door. Refer to figure 13 for location
4. Mark for future identification and disconnect the wires connecting the fan motor at the terminals on the main wiring junction.
5. Remove combustion air fan and clean as necessary using a wire brush and solvent to remove sticky residues.
6. Re-assemble and check for free rotation before proceeding to test the appliance.

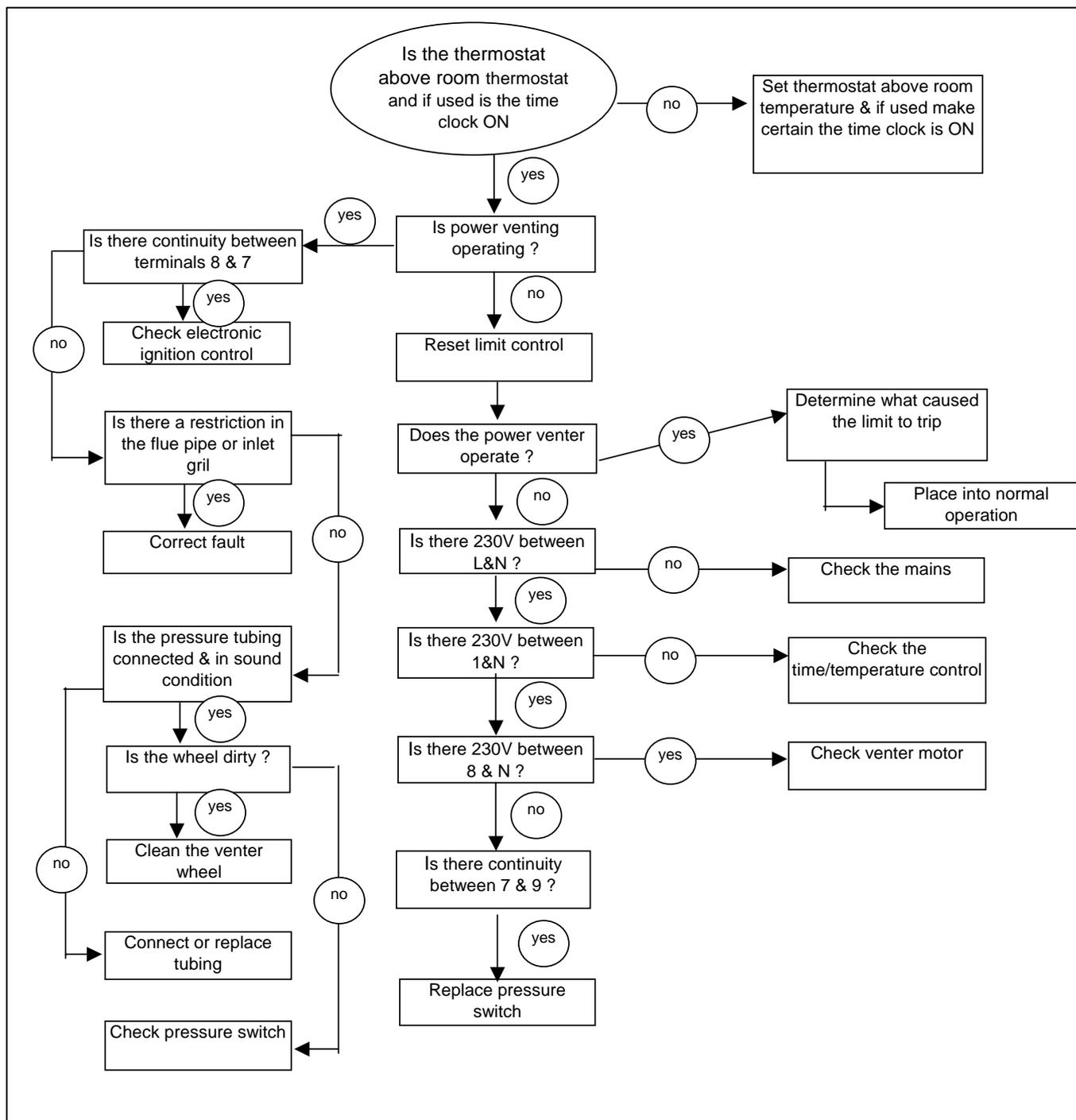
Fig. 14b - Installing the igniter



8.0 FAULT FINDING

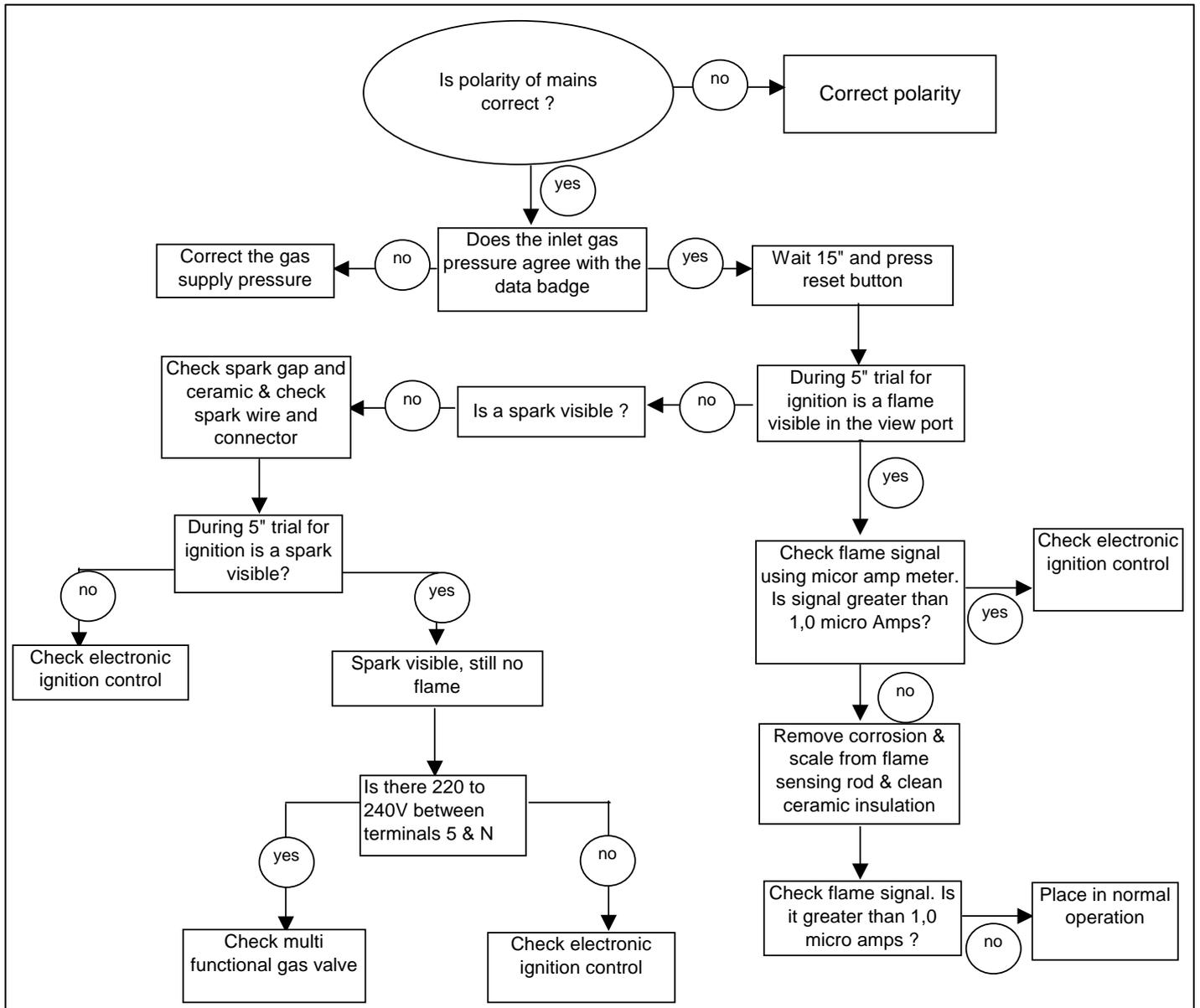
8.1 Main fault finding chart - Lockout indicator light is "OFF", but air heater will not operate

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



8.2 Ignition Controller Lockout indicator Light Repeatedly Comes "ON"

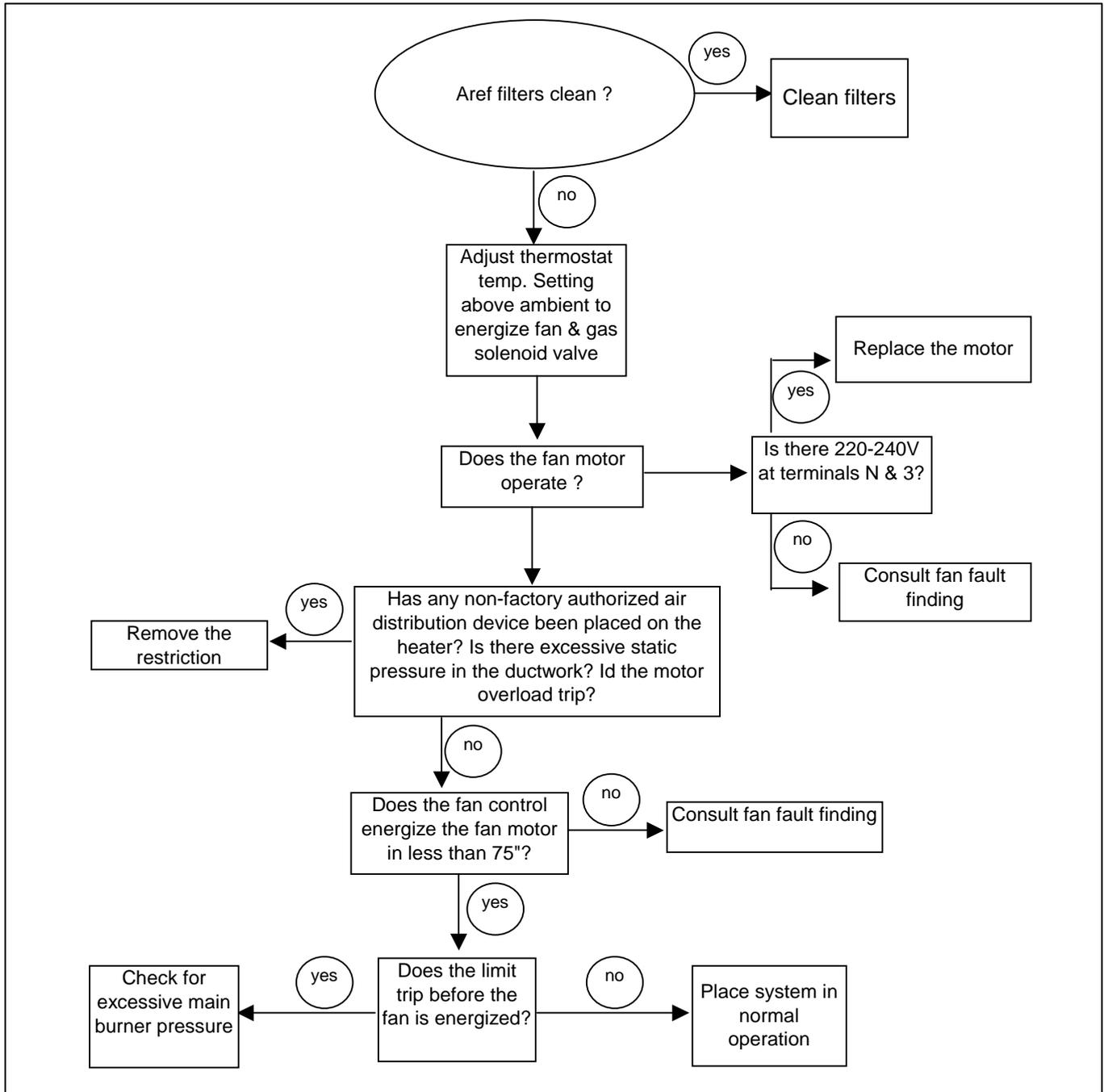
WARNING: Fault finding may only be carried out by appropriately qualified persons



8.3 Limit Control Fault Finding Chart (limit control trips)

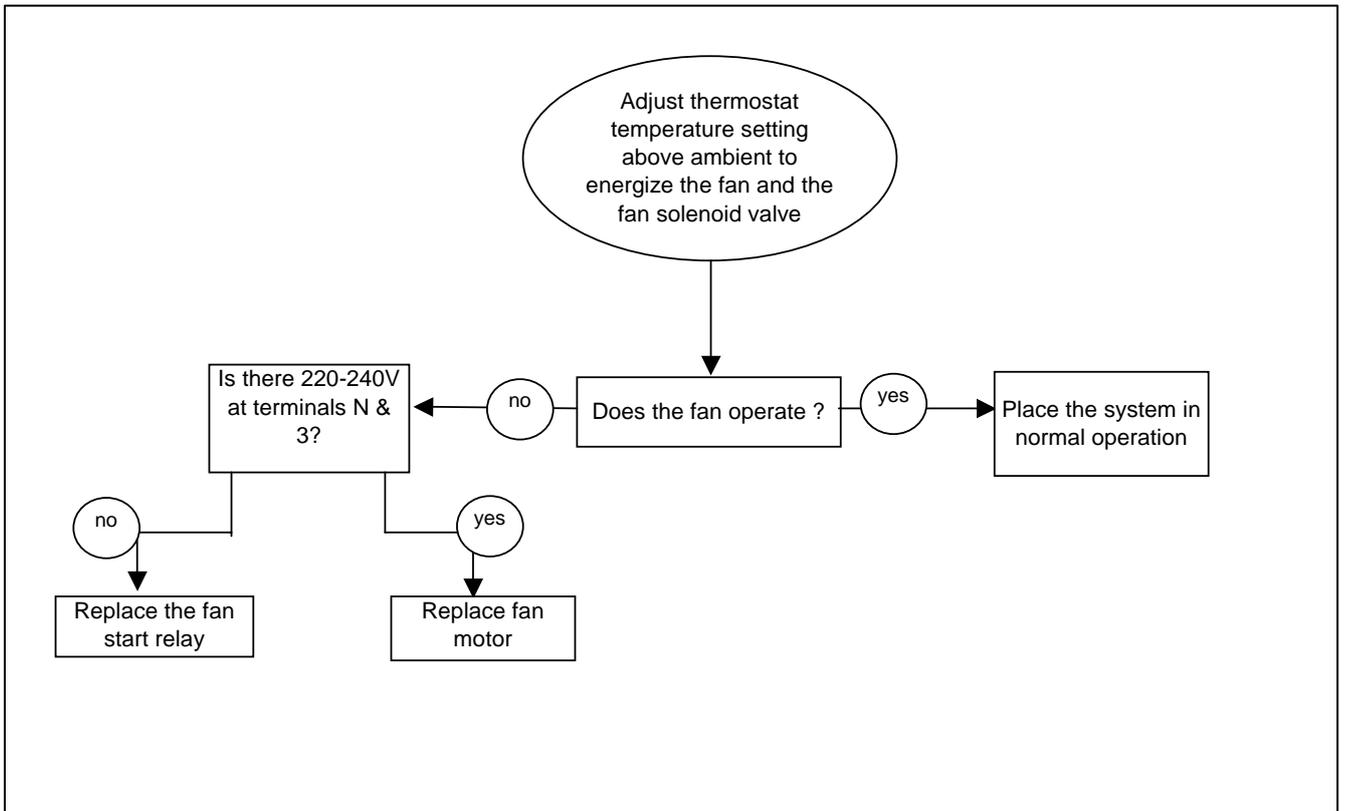
WARNING: Fault finding may only be carried out by appropriately qualified persons

Note : RHC 4000 DJL/RJL air heaters are equipped with 2 limits (a recycling limit and a manual reset limit). During normal operation, neither limit should trip even if the main electric supply is interrupted during operation. In the event of motor failure, the recycling limit will trip opening the gas valve.



8.4 Fan Fault Finding Chart

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



9.0 PARTS LISTING

Description	Type	PN	Application	Settings	
differential pressure switch	Yamatake/Honeywell C6065FH..	30_60607_xxx	all		
Thermal overheat control (limit) LC1	T.O.D. 60T 11201614	03_400US_01	all	170F out	130F in
Thermal overheat control (limit) LC3	T.O.D. 10H14 212557	03_400US_03	4011-4036	240F out	reset
Relay K1,1	Thermodisc 12 S 20	03_25167	all	20-60sec	60-120sec
Combustion fan with weel	ES30-98 (4011-15)	36_79015	4011-4015		
Combustion fan with weel	EBM motor+weel+house	36_79095	4018-4036		
Gas valve V + V'	SIT Tandem 830.040 type 4011-4036	03_25250	4011-4036		
Burner relay E	Brahma	03_25322	all		
isolation transformer	Erea 3VA (not appl.)	30_41530_3VA			
Relay K1.2	Potter & Brumfield T 92 S11 A22 (not appl.)	30_61742_240V	all		
Ignition electrode ER	channel products	03_400US_42	all		
Ionisation electrode IS	channel products	03_401US_195292	all		
Filter	FAH-DA-3100ZC (1.6A)	30_61747	all		

XXX : RHC 4011/4015 :** : ΔP setting out 68Pa (PN 30 60607 68)
RHC 4018/4036/4024 :: ΔP setting out 130Pa (PN 30 60607 130)
RHC 4030 : ΔP setting out 94Pa (PN 30 60607 94)

10.0 GAS CONVERSION

- 10.1 Reznor RHC 4000 DJL/RJL air heaters are designed to operate on natural, propane or butane gas and will be supplied fitted for the gas type ordered. In the event of site conversion to a different gas type it is necessary to convert the gas burner and burner controls.
- 10.2 Affix new data plate and gas type over-sticker.
- 10.3 Upon completion of conversion re-commission the air heater in accordance with section 5 of this document.

10.4 Changes to carry out :

- natural gas : SIT Tandem 830.040 (PN 03 25250) - set pressure regulator as per table 2A
- propane/butane : set pressure regulator on maximum pressure and seal regulation screw

To adapt gas injectors and gas inlet pressures, we refer to table 2A (page 4).

11.0 USER INSTRUCTIONS

OPERATING

How the air heater works:

Gas is burned by an atmospheric burner that fires into a heat exchanger. The gas burner is controlled by a double gas valve via an electronic burner control, which is actuated automatically via external controls i.e. a room thermostat and/or a time switch. The burner is ignited by a spark igniter. When the burner fires and warms the heat exchanger, the heat is sensed by a thermally actuated fan control which switches on the fan (in case there is no constant running fan) when the air temperature has reached its preset operating level.

At the end of a heating cycle the burner is switched off, the air circulation fan will continue to run until the air heater has cooled to a safe condition. Thereafter the fan will remain off until the next cycle is initiated.

Safety:

1. Flame failure is detected by the ionization probe which is the sensor and will immediately result in gas valve shut down.
2. Safety against overheating is assured by two overheat controls. The first is an automatic recycle control, which protects against low airflow i.e. clogged airways, fan failure etc. The second, which is set to a higher level than the first one, is a control, which locks out and switches off the burner in the event of gross overheating for any reason. Manual intervention is necessary to reset this control device. Resetting of the automatic burner control may also be required.

To light the heater:

1. Turn on the gas supply to the air heater.
2. Switch on the electricity supply to the air heater.
3. Ensure time switch (if fitted) is set to an 'ON' cycle.
4. Adjust control/room thermostat to desired temperature.
5. Air heater will light automatically when the room thermostat calls for heat after +/- 30 sec.
6. If the appliance does not light:
 - a) check that the burner control does not require resetting. An indicator light glows at the back panel of the appliance and on a remote control if fitted. Reset by pushing reset/button on appliance or the remote control.
 - b) check if thermal overheat control requires resetting

7. If the thermal overheat control requires resetting and doing so restarts the air heater, wait until the appliance warms to thermal equilibrium, to ensure the overheat control does not lock out again. **If it does and the return air temperature near the heater is less than 30°C, then switch off the appliance and call for service.** If the return air temperature is over 30°C, take appropriate action to reduce the ambient temperature near the air heater.

Air circulation:

The space heating process is for air to be circulated through the appliance whereby it gains heat from a heat exchanger. The air is directly discharged into the space to be heated. The air is eventually recirculated. Therefore it is very important that an unobstructed path for the circulation of the air will be maintained.

Maintenance:

1. Maintenance and service must only be carried out by appropriately qualified persons e.g. "Corgi" registered undertakings.
2. It is in your interest to ensure proper service and maintenance is carried out at a regular basis. Periods between services are dependent upon the local environment where the heater is installed. All gas appliances should be serviced at least once a year.
3. In case of any damage to the appliance, it must be shut down completely and checked by an appropriately qualified person.
4. In the event of difficulties in resolving any of these matters, please do not hesitate to contact Reznor or their official distributor.

NEVER SWITCH OFF ELECTRICITY SUPPLY TO THE AIR HEATER WITHOUT FIRST CLOSING THE GAS TAP

12.0 HEALTH & SAFETY STATEMENT

12.1 General

Under the Consumer Protection Act 1987 and Section 6 of the Health and Safety at Work Act 1974 we hereby provide the following information on substances hazardous to health.

Product range reference RHC 4000 DJL/RJL Series air heaters.

12.2 Cautionary note

During first firing some smoking may occur, this is due to the burning off of protective/lubricating oils used during appliance production. Most of this will have been removed during the production testing process. It is a wise precaution to ensure that adequate ventilation is provided during the initial firing and throughout the commissioning period, this is particularly important if the discharge air is to blow into a confined space. This smoking does not constitute a poison hazard.

12.3 Declaration

Reznor products contain no asbestos; copper is not employed in gas carrying components; solder which has a melting point below 450° C is not used; paints for corrosion protection and decoration are heat cured and contain no lead.

The above appliances meet the Electrical Safety requirements of EN60 335 Pt 1 1988.

12.4 Miscellaneous

Small quantities of adhesives and sealants used in the product are dried and cured and present no known hazard.

12.5 Insulation and Seals.

Material: Alumino - silicon fibre - crane glass
Description: Tapes

Known hazards: Some people can suffer reddening and itching of the skin. Fibre entry into the eyes will cause foreign body irritation. Inhalation will cause irritation to the respiratory tract.

Precautions: Wear protective gloves when handling.

People with a history of skin complaints may be susceptible to irritation.

Dust levels are only likely when the material is abraded.

In general normal handling and use for this purpose will not present discomfort. Follow good hygiene practices, wash hands before consuming food or using the toilet.

First Aid: Medical attention must be sought following eye contact or prolonged reddening of the skin.

12.6 Thermostat.(Thermal overheat (limit) control LC3)

Material: Illuminating Kerosene.

Description: Sealed phial contains a small quantity in liquid form.

Recognition: Colourless liquid,paraffin oil/petroleum hydrocarbon odour.

Characteristics: Non-corrosive, flammable with no poisonous reference-CH poison Class 3

Precautions: Avoid handling. This product can irritate and defat the skin. Prolonged contact may cause dermatitis. Avoid breathing vapour. Avoid eye contact. Do not ingest.

First Aid: Skin. Wash thoroughly with soap and water.

Eyes. Rinse immediately with copious amounts of clean water.

Ingestion: Seek medical advice.

NOTE: If skin irritation persists seek medical advice.

12.7 Electrolytic Capacitor

Two types are used by random selection:

Recognition: 1. Plastic enclosure 2. Aluminium enclosure

Material: Contained liquid electrolyte

Known hazards: Electric shock possible if charged.

Precautions: Discharge to ground/earth. Do not incinerate.

First Aid: Treat for electric shock if affected.