KIRBYAIR

KIRBYAIR™ COMPACT

High-Efficiency Gas Furnace

Installation & Service Instructions

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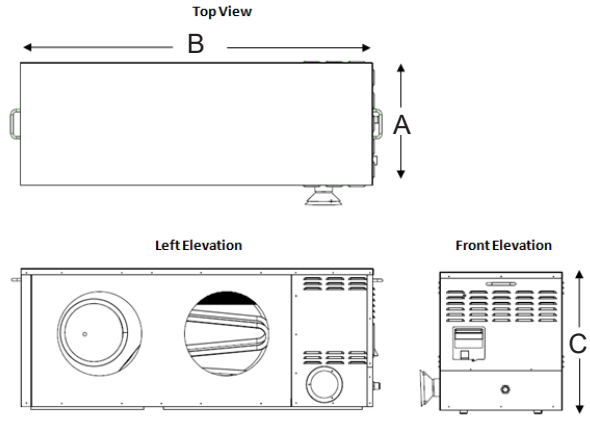
Contents

1.0. Installation Instructions

1.1. General

The KirbyAir™ Compact range of gas furnaces are designed as a single stage, non-condensing central gas ducted heating unit. Throughout the installation and service instructions, reference is made to the general aspect of the unit with dimensions indicated in Figures 1 and 2 noted in Table 2.



Figures 1 and 2: General Aspects

As shown in Figures 1 and 2 the access service panel, where the gas, power and thermostat are connected, is located at the front of the unit. With respect to the front access the rear side contains the fan box (as seen in Figures 1 and 2) where the motor and the wheel are fitted for return air inlet. The burner heat exchanger box with service access panel is the front section of the heater where the supply air is taken from, while the flue is discharged through the side panels of the front section. The front section behind the service panel contains access to the Printed Circuit Board (PCB) controls, the gas burner, combustion fan, and the gas valve. The gas inlet connection is given at the front lower section. Access to the fan wheel and motor is achieved on the far-right hand side.

1.2. Models

These installation and service instructions cover the following range of KirbyAir™ Compact internal and external gas furnaces:

KG4-165	KirbyAir™ Compact High-Efficiency Gas Furnace 16.5 kW
KG4-200	KirbyAir™ Compact High-Efficiency Gas Furnace 20.0 kW
KG4-265	KirbyAir™ Compact High-Efficiency Gas Furnace 26.5 kW
KG4-315	KirbyAir™ Compact High-Efficiency Gas Furnace 31.5 kW

The KirbyAir™ Compact range of gas furnaces are intended for use with natural gas as specified on the data plate.

Table 1: Specifications

Model	Unit	KG4-165	KG4-200	KG4-265	KG4-315
Heat Input	MJ/h	64	80	102	120
Heat Output	kW	16.5	19.5	26.5	31.5
Air Flow	L/Sec	470	630	770	940
Electrical Power	V/Hz/Ph	240/50/1	240/50/1	240/50/1	240/50/1
Thermostat Control	V	24	24	24	24
Maximum Add-On Cooling	kW	8	11	14	18
Energy Star Rating	Stars	4.5	4.7	4.7	4.8

Table 2: Dimensions

Model	Unit	KG4-165	KG4-200	KG4-265	KG4-315
A - Width	mm	360	432	585	585
B - Depth	mm	1165	1180	1180	1180
C - Height	mm	450	450	450	450
Return Duct Connections	mm	300	350	400	400
Supply Duct Connections	mm	300	350	400	400

1.3. General Requirements

The installation of this appliance must conform to the following requirements:

1. These installation and service instructions
2. AS/NZS 5601
3. Local gas fitting regulations
4. Local building regulations
5. Local electrical supply authority regulations
6. Fitment of dedicated circuit breakers in the power line of the unit in the meter box

1.4. Location

The KirbyAir™ Compact is designed for installation in either a roof or underfloor space (for internal models) or external to the building (for external models), with connection to a warm air heating duct system.

Although the location is generally predetermined, please check with the owner or builder for detailed installation plans. If a location has not yet been decided, consideration must be given to the following:

1. The location must provide adequate structural support; space for service access; and clearances for return and supply air duct connections.
2. Care should be taken to locate the unit and ductwork so that the supply air does not short circuit to the return air.
3. Proper electrical supply must be available.
4. Proper gas supply must be available.
5. Clearances must be provided.
6. Enough partition with insulation and cushioning for noise dampening between the unit and the living space.

1.5. Clearances

The following clearances must be provided for installation:

- 600mm at the front and sides of the unit to allow for servicing
- 600mm wide walkway for servicing from the access point in accordance with AS/NZS 5601
- 100mm above the lid of the unit

Please refer to Figure 3 for clearances.

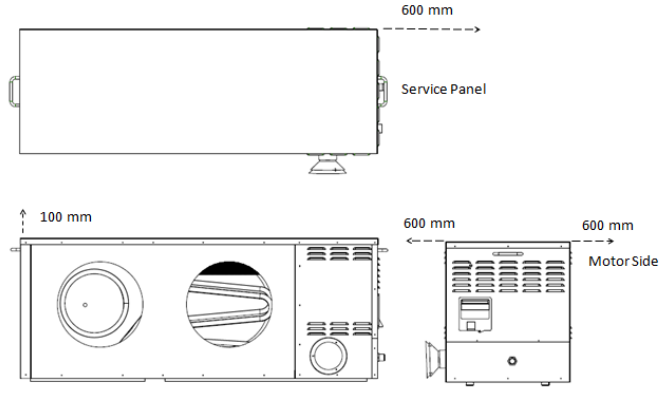


Figure 3: Minimum Installation Clearances

NOTE: Ducting must not intrude on these clearances for servicing, except for connections.

1.6. General Installation

The following sequence of installation steps is suggested. Reference is also made to the Final Installation Checklist.

NOTE: Always ensure appropriate manual handling and safety procedures are adhered to throughout installation. The KirbyAir™ Compact is fitted with handles at each end to assist manual handling.

1. Inspect the site for area and space of a minimum 2000mm long x 1800mm wide to put the unit and set in flat and stable position. For on ground installation, an appropriate concrete slab of the same size is recommended to be used under the unit.
2. Make electrical power connections with a light above available within 1000mm of the front access panel of the unit with a switch next to it.
3. Route ¾ inch natural gas piping with isolating gas cock connected next to the unit.
4. Connect all ductwork after 1500mm straight duct lengths for return and supply from the unit. Failure to comply with ductwork requirements may impact performance and void warranty.
5. Connect the flue (100mm / 3 inch metallic) for internal installation, using the given elbow.
6. External units come with a factory fitted flue terminal with no work required.
7. Connect a thermostat using 24V appropriate gauge wiring connections.
8. Power up the unit.
9. Start and check the system for the given nominal gas pressure at the gas valve outlet for operation.
10. Balance the air pressure in all the vents and explain the thermostat operation to the user. Advise on any servicing and maintenance aspects of the unit and filter on the return air grill where applicable.

1.7. Roof Space Installation

1. The area in the roof space must be capable of supporting the additional load of the appliance. The unit base rails must be placed flat and stable on a solid board with specified clearances all around for servicing. If uneven, the base board must be made flat and vibration free prior to unit installation.
2. Access must be available to the unit by means of fixed access via a manhole capable of supporting a person, using a normal ladder or steps.
3. A walkway must be provided between the access point to the roof space and the unit. This walkway must be permanently fixed, capable of carrying the weight of a person, and extend all the way around the unit.
4. Permanent lighting must be provided at the unit, with the switch located at the point of entry to the roof space.
5. The unit must be installed on a solid based (fire retardant board exempt), extending 600mm in front of the unit. A minimum clearance of 100mm between the top of the appliance and any combustible material must be maintained.
6. Ensure that any ceiling insulation material is kept clear of the appliance by a minimum of 100mm.
7. This is a non-condensing furnace in which there is no condensate discharge to be terminated.

1.8. Under Floor Installation

The KirbyAir™ Compact may be installed under the floor, provided that:

1. A minimum clearance of 600mm should exist between the underside of the floor joists and the ground. The ground where the unit has to be installed should be a 2000mm x 2000mm flat area. The 600mm clearance is to extend from the access opening to the appliance, and around the appliance.
2. Where minimum clearances exist as above, the unit shall be located within 2000mm of the access opening.
3. Where greater clearances than above exist, the unit may be installed at any distance from the access opening considering the flue discharge.
4. A minimum clearance of 100mm between the top of the unit and the lowest part of the floor structure must be maintained.
5. The unit is to stand on a level concrete base of at least 50mm thickness, and provision must be made to drain away any seepage or ground water so that water can not come into contact with the unit.
6. Fixed electrical lighting must be provided at the unit, with the switch located adjacent to the access opening.

1.9. External Installation

Every KirbyAir™ Compact gas furnace is available in an external model, fitted with an external flue (wall flashings provided separately). Before installing the unit, use a concrete slab to put the unit on, high enough from the ground level to ensure that rain and storm water do not enter the cabinet.

The unit can be installed with the flue facing the wall, or opposite to the ducts, and once the ducting and collars are fastened to the U shape flashing, must be fastened onto the unit mounted over the ducting, and fastened on to the wall so as to prevent rain water for entering the ducting of the unit. The flue terminal provided with the unit should remain fastened on to the flue pipe.

1.10. Fluing

The unit must be flued to the outside environment in accordance with AS/NZS 5601. The size of the circular flue required for each KirbyAir™ Compact model is listed in Table 2. Lateral flue runs shall not exceed half the total flue run with a certified Flue Cowl fitted at the discharge end. If the location does not permit this, provision shall be made for a duct to carry the flue vertically upward the unit through the building to terminate it into the atmosphere. If the bare flue length is more than 3000mm, the flue may condense and therefore condensate should be discharged at the horizontal flue pass to the nearest drainage point using a silicone or non-corrosive tube, referring to installation code guidelines. The total length of the flue should not be more than 10000mm.

1.11. Gas Piping

NOTE: A licensed professional must install the gas piping.

The connection at the unit is to a ³/₄ inch BSP male thread located at the inlet of the gas control (found at the lower end of the unit). A single female ³/₄ inch flare nut is supplied with the unit for connection to the required gas piping. An AGA approved appliance isolating cock must be installed close to the unit. Gas piping material and size must be in accordance with AS/NZS 5601. The gas connection must be tested for any leakage.

DO NOT USE AN OPEN FLAME OR OTHER SOURCE OF IGNITION FOR LEAK TESTING.

Figure 4 illustrates a typical gas valve showing the location of the gas inlet and outlet and the pressure testing point.

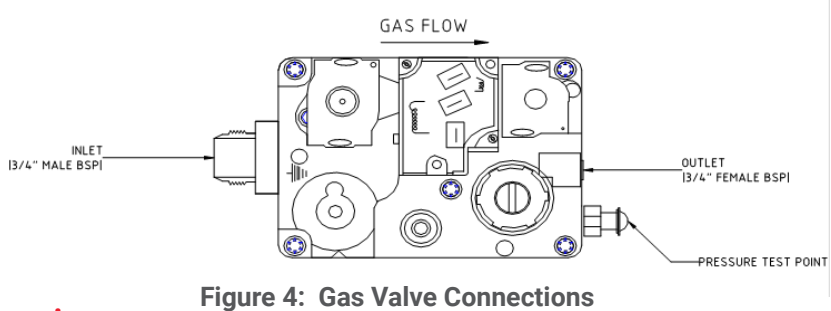


Figure 4: Gas Valve Connections

1.12. Power Connections

Check that the electrical supply meets the values specified on the name plate and wiring diagram of the unit. The wiring diagram should be found on the front panel of the unit. The 10 ampere general purpose outlet is required to be positioned within 1500mm of the unit. Wiring shall be in accordance with the local supply authority regulations. Ensure that polarity of the power outlet is correct, as shown in Figure 5.

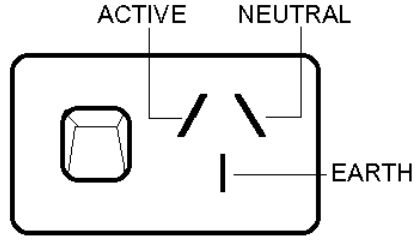


Figure 5: Power Point Connection Polarity

A suitable electrical light is to be provided near the unit to assist with servicing and the switch placed adjacent to the access opening.

1.13. Room Thermostat

The KirbyAir™ Compact is run with either a manual or programmable room thermostat. The thermostat should be installed on an internal wall, approximately 1500mm above the floor where it will be exposed to open flow living room air circulation, normally near the return air intake. It should not be installed on an outside wall or where it is exposed to direct sunlight, heat sources, draughts, or other conditions, which could adversely affect its operation. Generally, the hallways/walkways, living or dining room is a suitable location, provided there are no cooking facilities or refrigeration appliances on the opposite wall facing the thermostat. Mount the thermostat and route the 24-volt control wiring from the thermostat to the heater unit. Connect the terminals labeled “R” and “W” on the thermostat to the screw type terminals labeled “R” and “W”, respectively, on the PCB connection strip. Ensure that the hole through the wall for wiring to the thermostat is sealed to prevent draughts from affecting the thermostat. The control wiring that passes into the heater should use a cable gland for safe harnessing the wiring on to the PCB. This gland should be fixed in the hole located at the lower left hand side of the upper access door. For further information concerning the thermostat please refer to the separate thermostat instructions used with the unit.

1.14. Duct Connections

All return air and the supply air duct connecting collars are circular. Refer to Table 2 for dimensions. Two starting collars are provided with each unit. It is very important to the satisfactory functioning of the installation that the duct system be properly sized, installed, and pressure-balanced.

1.15. Warm Air Ducting

From the outlet/supply air duct connection of the unit, install adequately sized ductwork to the outlet/supply air registers. Flexible ducting should be used where noise transfer may be a problem particularly at the duct connection points. All ductwork, fittings and registers shall be sized to comply with AS5706. It is highly recommended that the ductwork be insulated, especially where it runs through an unheated space. The supply air connection should be transitioned to the proper duct size. All ducts should be suspended using flexible hangers. Ductwork should not be fastened directly to the structure. Care should be taken to ensure that all ducting is free from internal obstructions, free of leaks and adequately supported. Likewise ducting should not be caved in, crushed, or slack in any manner.

1.16. Return Air Ducting

A return air duct must be provided and should draw air from a central location within the house. The maximum recommended duct length is 6000mm. This ducting may be installed to either or both of the return air connections found on the left and right hand rear sides of the unit. In instances where the unit is drawing air from a building cavity make certain that it is fully sealed. This ensures that outside air is not drawn into the system, which will affect performance of the heater. A filter is recommended to be used only in the return air grill for dust free air circulation into the heater.

1.17. Outlet Registers

Suitable outlet registers/diffusers must be provided in all areas being heated.

1.18. Filters

The use of filters is recommended in order to keep the duct system clean and to collect dust, lint and other debris from entering the heating unit. Where a filter is installed in the return air duct, it should be in a position where it is accessible for ease of cleaning. Where a filter is fitted, the return air grille dimensions should be increased by at least 30%.

NOTE: Filters are not permitted on the supply air vents under any conditions.

1.19. Add-On Cooling

Where either presently or in the future any KirbyAir™ Compact unit may be installed with the correct indoor refrigerated coil section, it should be installed at least 1500mm downstream of the supply air duct connection.

1.20. System Balancing

Provision for system balancing by using dampers or other suitable means for adjusting airflows must be provided in the duct layout.

1.21. Fan Adjustment

The fan is preset during manufacturing to operate at a designed speed. The fan speed should not be changed without the expressed authorisation of the manufacturers.

1.22. Installation Notes

1. A 30-second delay is given to run the fan from the ignition taking place.
2. The fan speed is factory-set so that discharge air temperature does not exceed 60 degrees
3. No modification inside the unit is permitted at the installation site.

Kirby HVAC&R Pty Ltd reserves the right to void warranty conditions for units which have been modified and holds no responsibility for the consequences that may arise as a result of modification to the unit.

1.23. Pre Commissioning Checklist

- Have all the gas lines been checked for leaks?
- Is the fan motor correctly wired?
- Is the thermostat correctly wired for polarity for W*G*R, and wiring harnessed?
- Filters are clean and in place with the correct size of the return air grille?
- Outlet registers/diffusers and return air grille are open?
- Ductwork sized adequately and correctly installed for smooth air flow without sharp bends?
- Gas is open, power is on, and thermostat is one with preset temperature higher than the room temperature?

1.24. Commissioning Procedure

1. Check the burner pressure setting. The correct pressure for natural gas is 0.87 kPa for all models.
2. Ignite the unit by setting the room thermostat to call for heat by raising the set point above the current room temperature.
3. Having successfully achieved ignition, after a period of 5 minutes, check the airflow at all the registers and adjust the dampers to achieve design air quantities. Maximum air delivery temperature at the outlets should not exceed an average of 50 degrees C. Maximum air delivery temperature at the supply air connection should not exceed 60 degrees C, or 55 degrees C for extra air models. If this requirement is not met the duct pressure balancing must be performed.
4. Check the operation of the over temperature switch by restricting the airflow (the over temperature switch will automatically reset on cooling down). Restricting the airflow can be achieved by blocking the area of the return air grille.
5. Turn the room thermostat to the 'OFF' position. The room air fan should stop after a period of approximately 50-seconds.
6. Check the flue for leaks and spillage. Spillage may occur if the flue installation is faulty and is not properly sealed. If so, this condition must be corrected.

NOTE: The user must be instructed on how to correctly operate the system.

All units are fitted with automatically resetting high temperature limit switches. It is important to leave a minimum number of registers open otherwise the unit will cut out on the high temperature limit.

1.25. Minimum Number of Vent Openings

The following minimum number or more vents should always remain open:

KG4-165	3
KG4-200	4
KG4-265	5
KG4-315	6

In case of less than above number of vents are open, or there is a power failure, the unit may over heat and short-cycle, or go to lockout mode and the high temperature manual overheat limit switch may activate, and may require human intervention to reset. When more vents are opened and or power is restored the over heat auto-reset high temperature limit will automatically reset but the thermostat may have to be turned down and up again to re-set and re-start the system.

1.26. Abnormal Operation

Should any of the following circumstances occur, cease using the unit and contact your installer or gas authority immediately:

- Smell of gas fumes; unusual odours, smoke or fumes from outlet registers.
- Excessive or unusual noise emanating from the unit.

1.27. Warnings

Advise the user of the following issues:

- Do not place articles on or against the unit.
- Do not use or store flammable materials near the unit.
- Do not spray aerosols in the vicinity of the unit while it is in operation.
- The front access panels of the unit must remain fitted while the unit is in operation.
- Do not put filters in the supply air vents/registers.

1.28. Maintenance

Advise the user of the need to clean any filters if fitted in the return air grille. Never turn a dirty filter around to allow air to flow in the opposite direction. Cleaning or replacing filters regularly keeps the unit operating at peak efficiency levels. The frequency at which cleaning or replacement occurs depends on the hours of operation and the local environment.

1.29. Final Checks

- Have all the parts of the unit been inspected for any damage due to transport?
- Has a suitable location been selected?
- Have electrical power connections been made according to all relevant standards?
- Has the gas piping been connected according to the relevant standards?
- Has the electrical control wiring been connected to the unit in accordance with the instructions?
- Has the gas inlet pressure to the unit been set correctly?
- Has all the required ductwork been installed properly with air balancing?
- Have all the relevant regulatory bodies been advised of the installation?
- Has the user been provided with a copy of the operating instructions and instructed on how the system operates with the connected thermostat?
- Has the user been advised of the unit's servicing requirements?

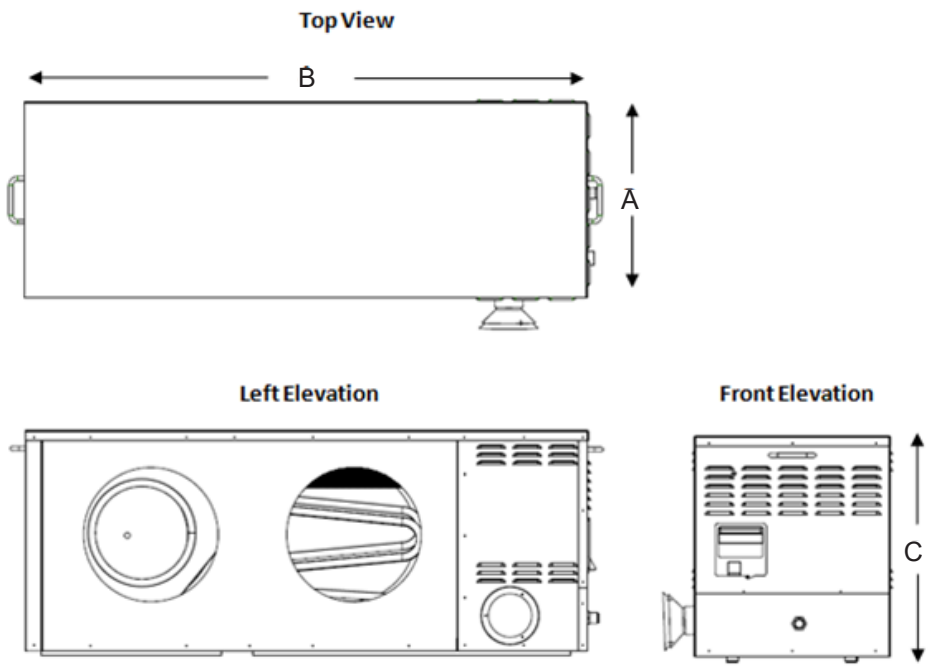


Figure 6: Dimensions (Refer to Table 2)

Table 2: Dimensions

Model	Unit	KG4-165	KG4-200	KG4-265	KG4-315
A - Width	mm	360	432	585	585
B - Depth	mm	1165	1180	1180	1180
C - Height	mm	450	450	450	450
Return Duct Connections	mm	300	350	400	400
Supply Duct Connections	mm	300	350	400	400

2.0. Service Instructions

WARNING

IMPROPER INSTALLATION, ADJUSTMENT, ALTERATION, SERVICE OR MAINTENANCE CAN CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR LOSS OF LIFE. INSTALLATION AND SERVICE MUST BE PERFORMED BY A LICENSED PROFESSIONAL INSTALLER OR SERVICE AGENCY.

NOTE: Please switch off the power and shut the gas cock before touching the appliance for service. Open the service panel as per instructions provided in this manual to service or replace any part of component of the unit.

2.1. Removal of Covers

All KirbyAir™ Compact units may be serviced from the front panel without needing to remove the lid or rear section panels. Side panels may be removed by undoing the outer screws on the panels.

1. Ignitor can be accessed from left bottom side of the burner. Undo the two screws using a star screw driver and the ignitor may be removed for replacement.
2. Flame sensor can be removed from the front right corner of the burner upper panel by undoing two screws.
3. Burner can be removed by opening the front upper access panel. In order to take the injector manifold out, remove both end brackets on the manifold fastened on the burner front, and a bracket on the base of the unit. This will allow changes to the burners, injectors and gas valve.
4. Gas valve can be accessed by opening the front lower panel. Remove the manifold side brackets and take out the injector manifold. Undo the gas valve and replace if needed.

Gas pressure should be fixed at 0.87 kPa or as specified in the appliance specification data sheet.

2.2. Diagnostic Conditions

In normal operation, a green light will flash continuously on the control board. If the unit fails to light, remove the access panel and observe the green indicator light to diagnose the fault.

2 Flashes — **System lock out due to failure to detect or sustain flame.**

- Check the flame sensor is connected to the board correctly and positioned above the burner port.

4 Flashes — **High limit or manual overheat switch opened.**

- Wait until the auto limit closes, or is manually cut off.
- Check for obstructions in the duct and open more registers.
- Reset the manual switch and attempt ignition from the thermostat.

5 Flashes — **Flame sensed and gas valve not energised.**

- Check the gas valve

Steady Light — **Internal failure.**

- Microcontroller failure and power on self check

Should the unit continue to fail to operate, contact your installer or Kirby HVAC&R.

2.3. Overheat Switches

Each unit is fitted with 3 auto-resettable overheat safety switches:

- 1x left of the fan with access from the return air spigot
- 1x right of the fan with access from the return air spigot
- 1x in the middle of the heat exchanger panel below the burner, above a manually resettable over-temperature switch

Temperature ratings are provided in Table 3.

Table 3: Temperature Ratings

Model	KG4-165	KG4-200	KG4-265	KG4-315
Automatic	3x A 60°C	3x A 80°C	3x A 80°C	3x A 80°C
Manual	1x M 80°C	1x M 90°C	1x M 90°C	1x M 90°C

2.4. Replacement of the Flame Sensor and/or Ignitor

Open the two screws of the flame sensors, and replace or service the flame sensor fitted on the front face of the burner top panel. The ignitor is located below the burner bottom. Open the two screws and pull down the ignitor for replacement. Ensure the ignitor lead of the replacement part is sleeved with a high voltage suppression lead. Ensure the gap between the electrode tips is not tampered with.

2.5. Pressure Switch

The unit will not work if the pressure switch is not operating properly - check that the flue is not blocked in any way. Ensure the air pressure tube is connected at both ends and with grey inlet of the switch and the spade connections are tight fit and made proper contacts. The replacement pressure switch should be of the same rating and part number as specified in the appliance. The switch can malfunction if it is not mounted fully harnessed properly on the specified location.

To remove the pressure switch, disconnect the air pressure tube, gently remove the two wiring connections, and remove the screws on the top and bottom, replacing it. Position and harness it in the same manner which it was originally installed and connect the air pressure tube back to the grey inlet with two wire spades reconnected.

2.6. Electronic Control Board (PCB)

The control board is protected by a 3 amp purple fuse located next to the transformer outlet with 24V connections. The fuse may be replaced by gently removing using long nose pliers. If the PCB is not showing power through the green LED flashing in the middle, check the power is connected. If not, the PCB may be required to be changed. When replacing the PCB, use the back spacers to position it correctly on the base and reconnect the wiring as per the wiring diagram.

2.7. Gas Valve

To replace the gas valve, shut the isolating gas cock and remove the access panel. Remove the gas manifold by undoing the side brackets on the burner and the base. Pull out gently the gas manifold with the gas valve. Using two spanners, undo the gas valve and replace it with the new one using the gas sealant on the threaded inlet outlet connections. Reposition the gas valve with manifold on the burner inlets one-by-one. Fasten the two side brackets and then the bracket on the base. Open the gas cock, make sure the ignitor, flame sensor, and gas valves connections are made as per the wiring diagram. Start the unit and ensure there is no gas leak. Replace the access panel and harness it properly with all screws.

2.8. Combustion Fan

To replace the combustion fan, remove the four screws around the mounting plate sealed on the flue box, knife the sealant around the box, and remove it. Replace the combustion fan and refasten the mounting plate with four screws, then sealing with high temperature silicon sealant. Fasten the fan with the mounting plate onto the flue box.

2.9. Supply Air / Ventilation Motor Fan

The supply air fan motor is mounted with a centrifugal forward curved wheel attached to it. Access to the motor is located on the far right hand side. Ensure the power is switched off from the GPO before accessing the motor. Remove the panel and access the motor. The motor is mounted with three nuts and bolts on a bracket fastened on the ring of the inner side panel of the housing. Remove these bolts and the ring around it. Remove the opposite side panel to access the wheel attached to the shaft and undo the grub screw to remove the wheel. If the wheel is undamaged, replace motor using the same wheel. Once the motor has been replaced, ensure the wiring is connected as per the wiring diagram and the connection to the safety switches in the fan box are not disturbed and are correctly repositioned, and the fan bracket is tightly fastened on the ring and the ring on the panel.

2.10. Heat Exchanger

The heat exchanger sits in the middle of the unit and is integrated to the burner facing panel from the top end to the bottom end and is harnessed onto the base of the unit. Remove the heat exchanger by undoing the screws on the base, outer lid, inner lid and burner box. Finally, undo the screws on the base and remove its sealing and take the heat exchanger out. Replace the heat exchanger, seal it off on the base and then fasten with the same size screws. Fasten the bracket in the middle of the tubes on the base, seal off the flue box onto it and then the combustion fan on the flue box. Fasten and seal off the burner box with gas manifold on the upper section of the heat exchanger, and finally connect all other components and wiring as per instructions before putting all the panels back on.

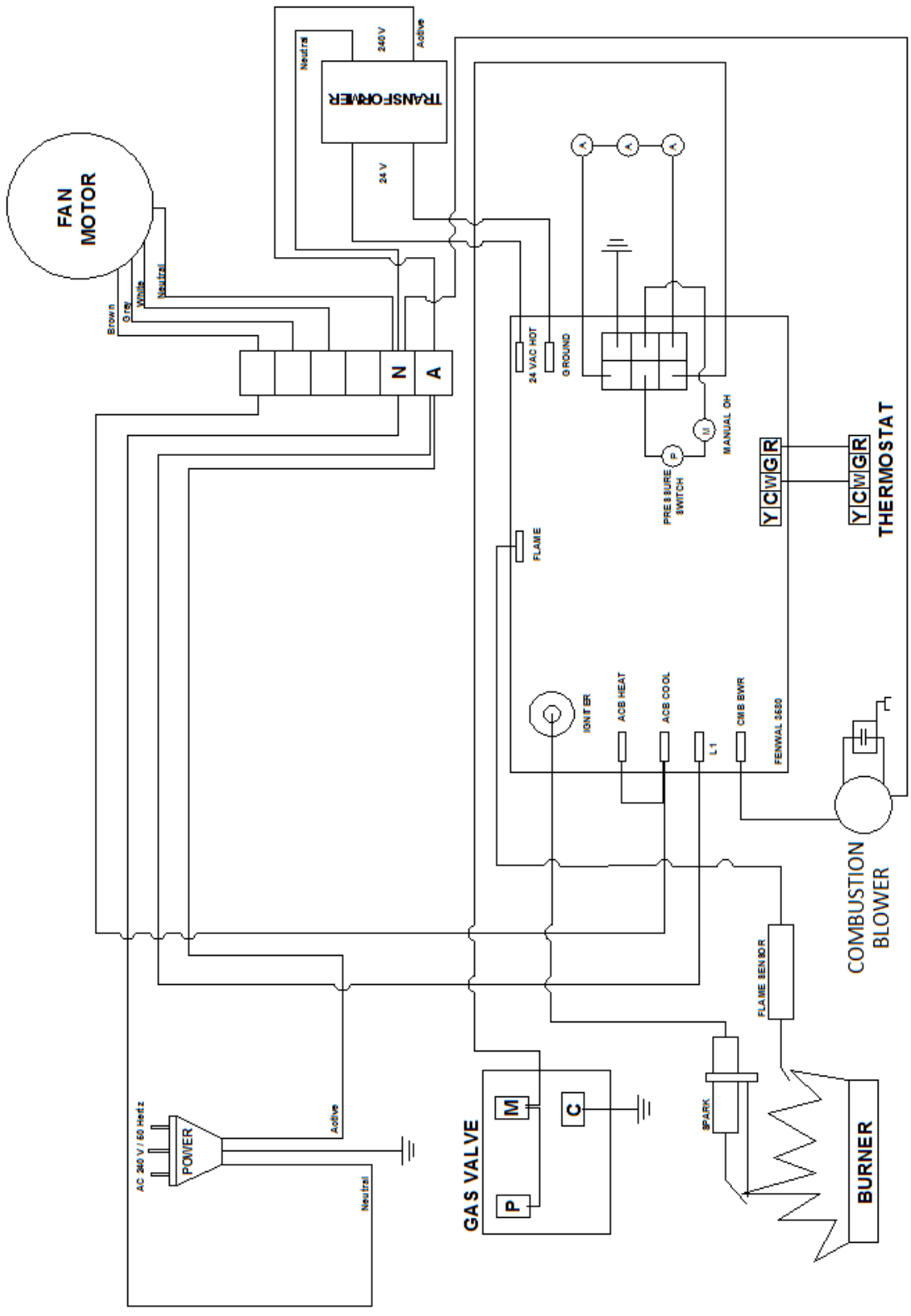


Figure 7: Wiring Diagram with Ignition Module

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