

**Directions For Use**  
***Zero Air Gas Generator***  
***With Compressor***

**ZA015A - HP**

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## Document Change History

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## **Safety First**

It is important that you thoroughly read and understand this manual before operating or servicing this Peak Scientific Instruments Gas Generator. PLEASE NOTE THE FOLLOWING CAUTIONS AND WARNINGS FOR YOUR OWN SAFETY.

### **! Caution –**

**Only authorized persons should operate or service this equipment.**

### **! Warning –**

**To avoid risk of electrical shock, personal injury, or death disconnect power before removing any cover of this equipment.**

### **! Caution –**

**To avoid risk of personal injury NEVER disconnect any pipe, fitting, or filter bowl while the system is pressurized. Always allow pressure to dissipate before opening the system.**

### **! Warning –**

**The Catalytic Process requires very high temperatures. Internal surfaces and copper lines are extremely hot and will cause burns. Always allow the generator to cool before carrying out any servicing.**

## Warranties and Liabilities

- 1) The Company warrants that it has title to the Goods.
- 2) Subject to the provisions of this clause the Company warrants that the Goods shall comply in all material respects with any specification referred to in the Order Confirmation (as the same may be amended) and shall, subject thereto, be free from defects in material and workmanship for the lesser of a period of twelve months from the date of delivery or thirteen months from the date of dispatch from the factory.
- 3) Save as provided in this clause and except where the Goods are sold to a person dealing as a consumer (within the meaning of the Unfair Contract Terms Act 1977) all warranties, conditions or other terms implied by statute or common law are hereby expressly excluded save to the extent they may not be lawfully excluded. When the Goods are sold to a consumer within the meaning of the Unfair Contract Terms Act 1977 their statutory rights are not affected by the provisions of this clause.
- 4) In the event of the Customer making a claim in respect of any defect in terms of clause 2 hereof the Customer must:-
  - 4.1) reasonably satisfy the Company that the Goods have been properly installed, commissioned, stored, serviced and used and without prejudice to the generality of the foregoing that any defect is not the direct or indirect result of lack of repair and/or servicing, incorrect repair and/or servicing, use of wrong materials and/or incorrect spare parts; and
  - 4.2) allow the company to inspect the Goods and/or any installation and any relevant packaging as and when reasonably required by the Company.
- 5) Subject to the Company being notified of any defect as is referred to in sub-clause 2 hereof within a reasonable time of it becoming apparent and subject always to the terms of sub-clause 4 hereof, the Company shall, in its option, replace or repair the defective Goods or refund a proportionate part of the Price. The Company shall have no further liability to the Customer (save as mentioned in sub-clause 6 hereof).
- 6) The Company shall be liable to indemnify the Customer in respect of any claim for death or personal injury to any person in so far as such is attributable to the negligence or breach of duty of the Company or any failure by the Company to comply with the provisions of sub-clause 2 hereof.
- 7) Save as provided in sub-clause 2 hereof the Company shall not be liable in respect of any claim by the Customer for costs, damages, loss or expenses (whether direct, indirect, consequential or otherwise) or indemnity in any respect howsoever arising including, but not by way of limitation, liability arising in negligence (other than pursuant to clause 6 above) that may be suffered by the Customer or any third party,

## SAFETY NOTICE TO USERS

**These instructions must be read thoroughly and understood before installation and operation of your Peak Gas Generator. Use of the Generator in a manner not specified by Peak Scientific Inst. MAY impair the SAFETY provided by the equipment.**

**When handling, operating or carrying out any maintenance, personnel must employ safe engineering practices and observe all relevant local health and safety requirements and regulations. The attention of UK users is drawn to the Health and Safety at Work Act 1974, and the Institute of Electrical Engineers regulations.**

## **1 Introduction**

The Peak Scientific Instruments range of Zero Air Gas Generators is designed to produce a constant flow of Zero Grade Air with a Hydrocarbon content (as Methane) of less than 0.1 ppm.

## **2 Unpacking and Installation.**

Although Peak Scientific take every precaution with safe transit and packaging, it is advisable to fully inspect the unit for any sign of transit damage.

**ANY DAMAGE SHOULD BE REPORTED IMMEDIATELY TO THE CARRIER AND PEAK SCIENTIFIC OR THE DISTRIBUTOR FROM WHERE THE UNIT WAS PURCHASED.**

After unpacking and a visual inspection, the unit should be placed in a ventilated area away from direct sunlight. Care should be taken not to obstruct the ventilation holes on the sides of the unit or the fan outlet on the lid.

The generator should be placed on a steady and level base. The generator will fit under most workbenches. Alternatively it may be placed on a workbench or in any convenient location.

Performance of the generator (like all sophisticated equipment) is affected by ambient temperatures and humidity. Continuous operation in ambient temperatures exceeding 25°C will lead to a reduction in capacity and prolonged operation in temperatures exceeding 30°C will shorten the life of the unit. Operation in relative humidity exceeding 70% may overload the filtration system and result in moisture carry-over. Additional moisture traps should be installed downstream of the generator should ambient regularly exceed 70% Rh. and also if the generator is any distance from the application. Moisture traps or coalescers should be located as close to the application as possible. Note should also be taken of the proximity of Air Conditioning outlets. These can sometimes give rise to "pockets" of air with high relative humidity. Operation of the generator within such a pocket could adversely affect its performance.

## **3 Electrical Connection**

### **Important Electrical Notice**

This unit is classified as SAFETY CLASS 1 equipment. **THIS UNIT MUST BE EARTHED.** Before connecting the unit to the mains supply, please check the information on the serial plate. The mains supply must be of the stated AC voltage and frequency.

<b>EARTH/GROUND (E):-</b>	<b>Green &amp; Yellow</b>	<b>OR</b>	<b>Green</b>
<b>LIVE (L):-</b>	<b>Brown</b>		<b>Black</b>
<b>Neutral (N):-</b>	<b>Blue</b>		<b>White</b>

### **Fuse**

The generator protection fuse is found in the pull out drawer of the mains inlet IEC euroconnector located on the bottom right hand side of the cabinet adjacent to the off/on switch. The fuse is rated at 10 AMP. A spare fuse is also provided in the drawer.

Connect the generator to a single phase supply using the power cord provided.

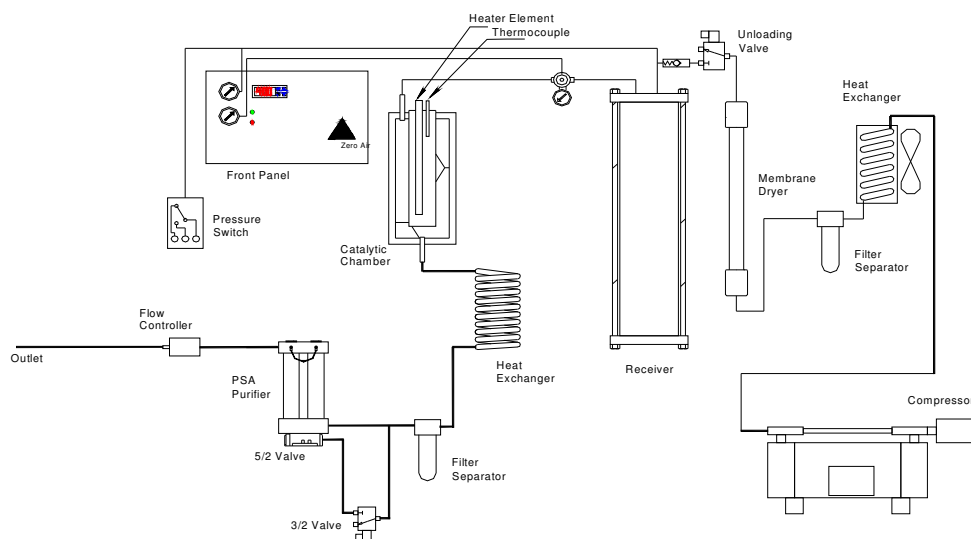
## 4 Air Connection

The Zero Air Generator has its own built-in air compressor and therefore does not require an external compressed air source.

The generator has two 1/4" BSP female bulkhead connections. The Zero Air outlet fitting is located on the left hand side lower and should be coupled to the application. At the rear of the unit is the condensate drain and should be led to a safe place. In all but a few areas of extremely low relative humidity there will be a significant amount of water liberated by the generator. This should be drained safely away or unsightly stains could result on floors or work surfaces. This water is clean and can be drained into normal domestic drains.

## 5 Principle of Operation

The ZA015A-HP Zero Air generator works on the fundamental principle of Catalytic Oxidation as illustrated in the following pneumatic diagram. See page 16 for a larger diagram.



ZAxxxA Pneumatic Diagram

### **Zero Air Generation**

Ambient air is compressed and after cooling is passed through the *Filter Separator* which removes liquid moisture and particles down to 0.1 micron. The air is then passed through a *Membrane Dryer* to remove any remaining moisture and on into an internal *Receiver*. The receiver is designed to provide volume within the system to cope with different flow rates and to allow the compressor to operate a duty cycle. When the Receiver reaches its maximum pressure the *Pressure Switch* will operate stopping the compressor and opening the unloading valve.

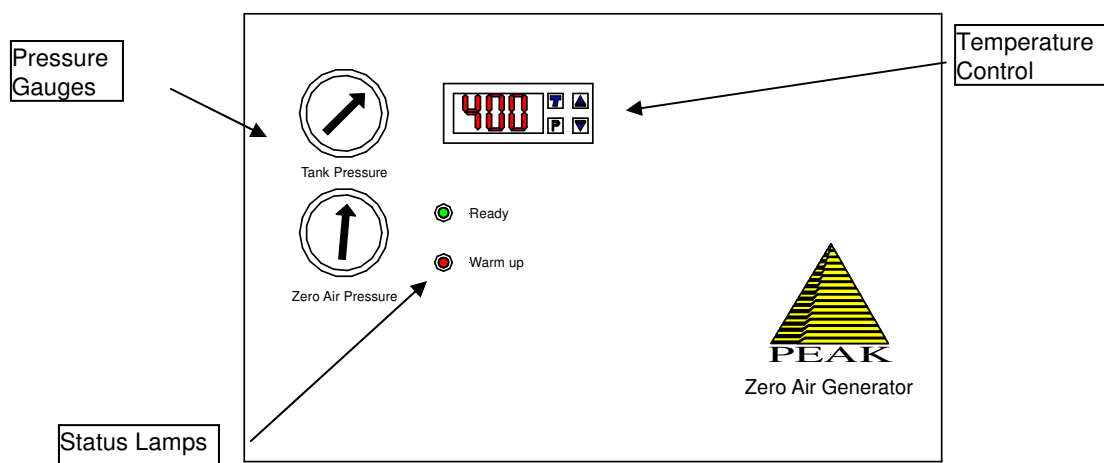
Air from the Receiver is regulated for pressure and passed to the 'Zero Air' catalytic combustion chamber. This works on the principle of catalytic oxidation where hydrocarbons from the incoming compressed air supply are *cracked* to carbon dioxide and water. The hydrocarbon level in the form of methane is reduced to <0.1ppm. For this process to work the catalyst requires to be heated to approximately 400 degrees Celsius. The free Carbon and Hydrogen atoms then combine with Oxygen in the air to form Carbon Dioxide and Water. After the catalytic chamber the air passes through a cooling coil to reduce its temperature to a safe level. The Carbon Dioxide and water are then removed by the PSA Air Purifier.

## 6 Commissioning

With the generator installed as described earlier remove the lower front cover. Check that all the internal components are securely located and have not become dislodged during transit.

**Re-fit the front cover before proceeding further.**

The Upper Front Panel is shown below.



Connect the generator to the electrical supply and turn the unit *ON*. The unit will begin to build up pressure as will be seen from the two pressure gauges. The lower gauge indicates the Output Pressure which is factory-set at 80 psig. The upper gauge indicates the internal receiver pressure which will fluctuate between 120 and 90 psig.

The Digital Display shows the Catalyst Chamber temperature. This is factory set at 400°C. There are two Status LEDs on the front panel. Once the Catalyst reaches operating temperature these will change from **RED** to **GREEN** indicating that the generator is ready for use. The generator should reach operating temperature within 40 minutes of switch-on.

Check that the cooling fans are operating and exhausting air out of the generator.



## **7     Routine Maintenance**

**WARNING:** Servicing and/or repair of the Generator should only be undertaken by a **TECHNICALLY COMPETENT PERSON** with the Generator safely isolated.

Due to the simplicity of the design and the small number of moving parts the Peak Gas Generator will have a long and trouble free life. However the following components should be replaced as follows:

<b>Compressor Inlet Filters</b>	<b>Every 6 months</b>
<b>Filter/Separator/Silencers</b>	<b>Every 12 months</b>
<b>Compressor Units (the lesser of)</b>	<b>Every 6000 hours or 18 months</b>

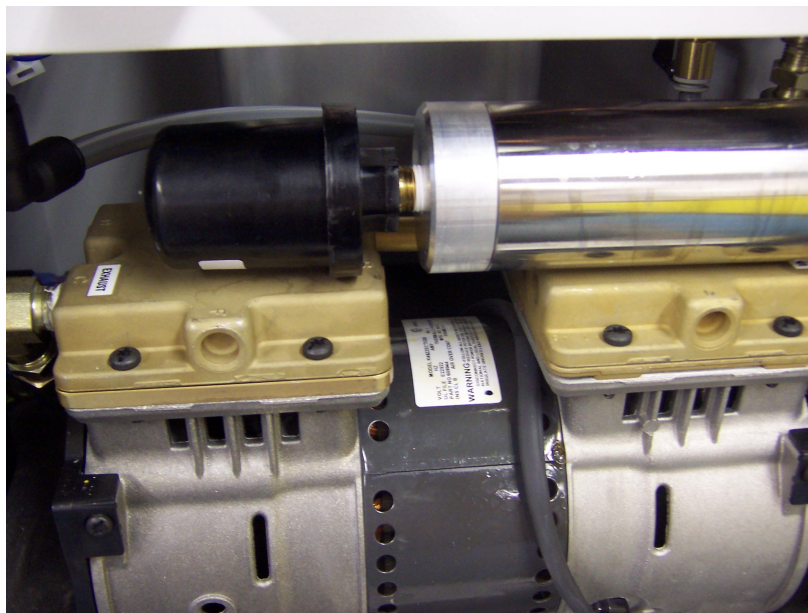
Service kits are available for all routine maintenance; please contact the factory for further details.

**FAILURE TO FOLLOW THE PRESCRIBED MAINTENANCE PLAN  
WILL INVALIDATE THE PRODUCT WARRANTY.**

**The Generator MUST be de-pressurised prior to attempting to remove  
ANY filter bowl. Failure to do this may cause injury.**

### **Compressor Inlet Filter**

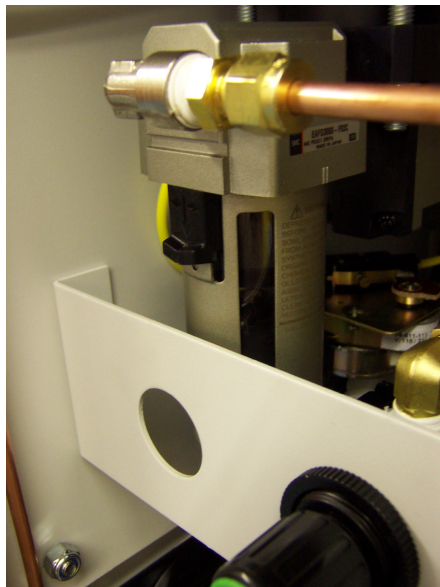
This should be changed at 6-month intervals. Part Number is 02-4187 (1 off) and the filter is located as shown.



Remove the cover by rotating it anti-clockwise ¼ turn. The element can then be removed. Re-fitting is the reverse procedure.

### **AFD 3000 Filters (2OFF)**

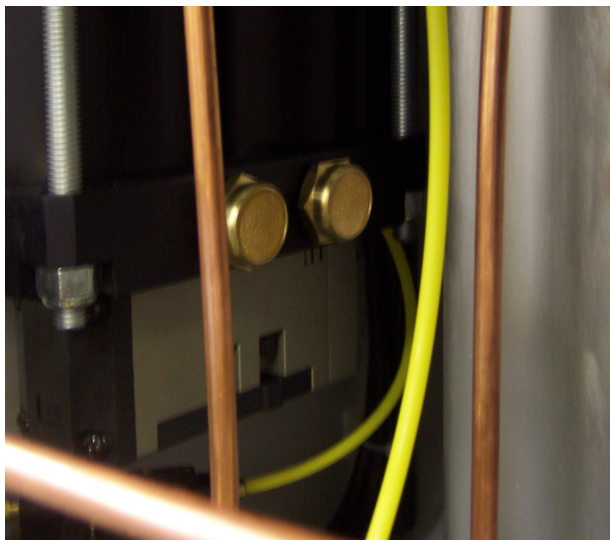
These elements should be changed at 12-month intervals. Part Number is 02-4335 (2 off).



Turn the bowl ¼ turn counter clockwise to release. The element then un-screws. Re-assembly is the reverse procedure.

### **Bronze Silencers**

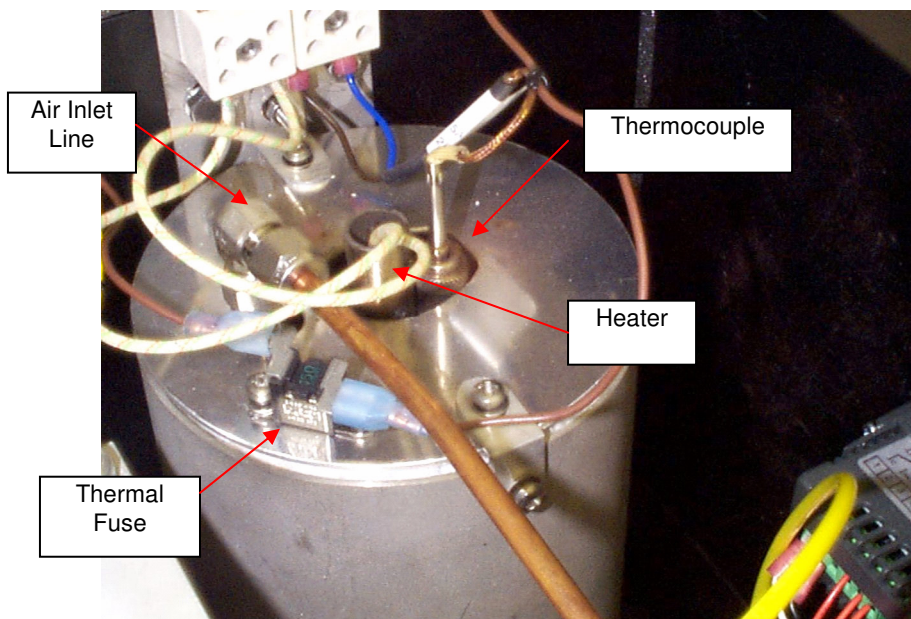
These should be changed at 12-month intervals. Part Number is 02-1033 (2 off).



## Catalytic Chamber

**The Catalytic Chamber is heated to 400°C and will cause severe burns if touched. If for any reason the chamber or its associated parts need to be examined the generator must be switched off and allowed to cool. THIS COULD TAKE UP TO 10 HOURS.**

The Catalytic Chamber takes the form of cylindrical chamber with a heated central core. The annular space is specifically designed to allow the required contact time with the catalyst to ensure complete oxidization. The complete chamber is contained within an insulated enclosure as shown below.



### Heater

Regardless of the supply voltage the heater is rated at 110 Vac. This minimizes the volt drop across the conductors and prolongs the life of the element. The Heater is contained within a stainless steel sleeve to facilitate removal should replacement be required.

### Thermocouple

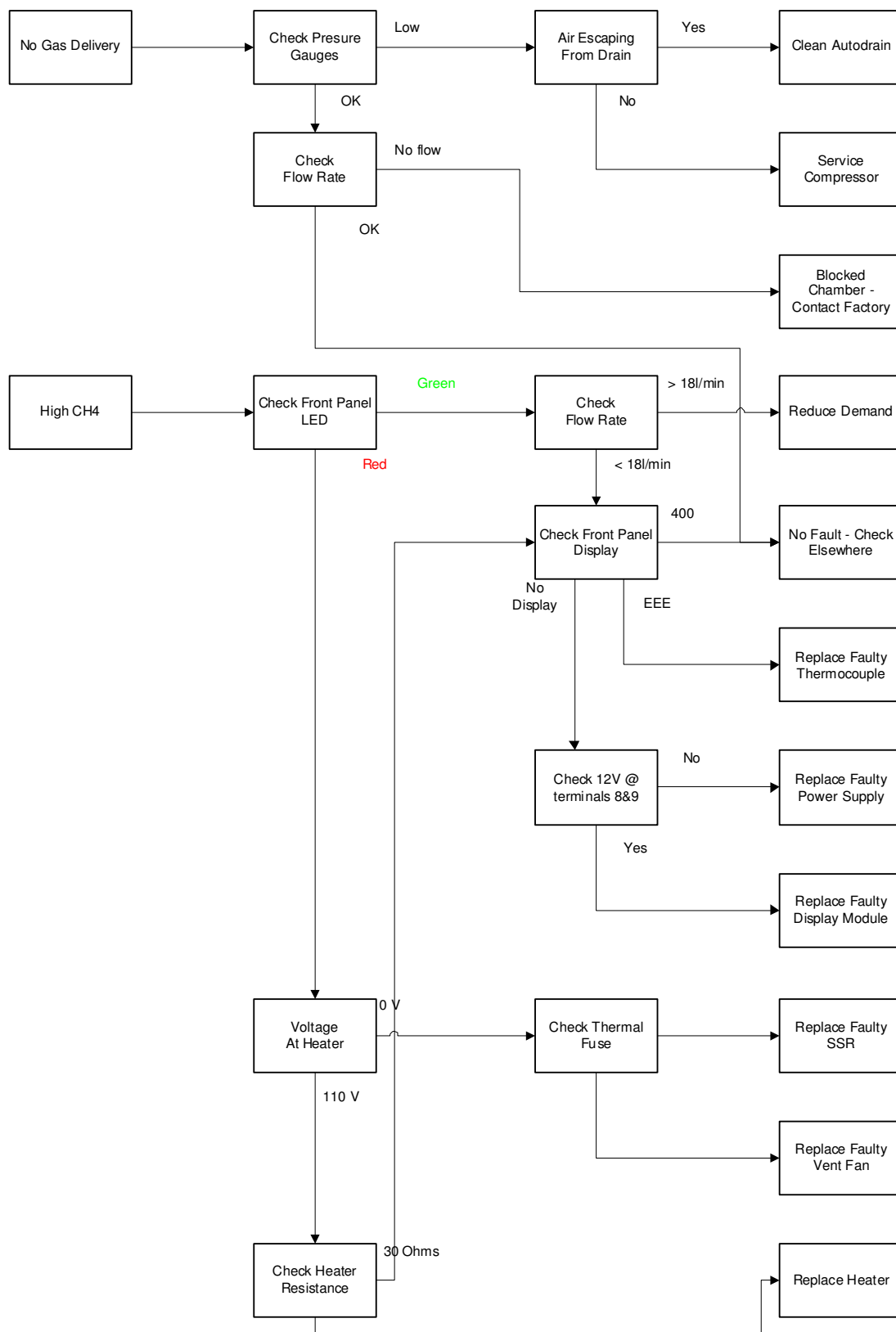
The thermocouple is "K" type spring-loaded bayonet fitting to ensure good contact with the chamber core.

### Thermal Fuse

The thermal fuse is provided as a safety feature to cut supply to the heater thus preventing chamber overheating in the event of a control or ventilation failure. It is a fail-safe device and if blown requires replacing.

**Note: - The thermal fuse will not blow under normal operation. A blown thermal fuse indicates that a fault exists which MUST be rectified before attempting to replace the thermal fuse. Refer to the trouble shooting chart on page 14 for guidance.**

## 8 Troubleshooting



## 9 Technical Specifications

### General Details

Minimum Operating Ambient Temperature	5 °C (41 °F)
Maximum Operating Ambient Temperature	30 °C (113 °F)
<b>Inlet Conditions (Free of oil and bulk moisture)</b>	
Minimum Air Inlet Pressure	N/A
Maximum Air Inlet Pressure	N/A
Maximum Hydrocarbon Content	N/A
Start up time for specified hydrocarbon concentration	8 hours

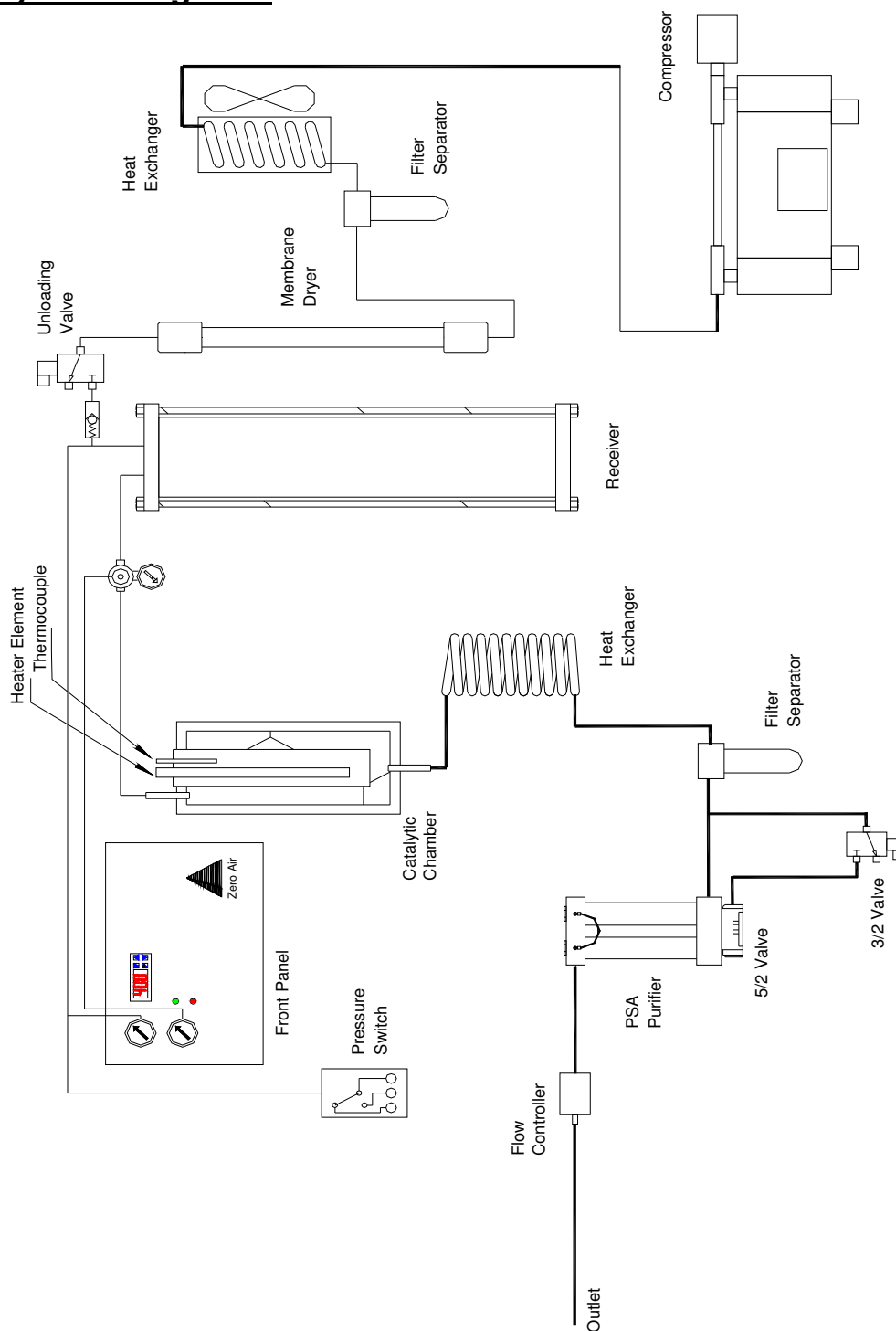
### Physical Details

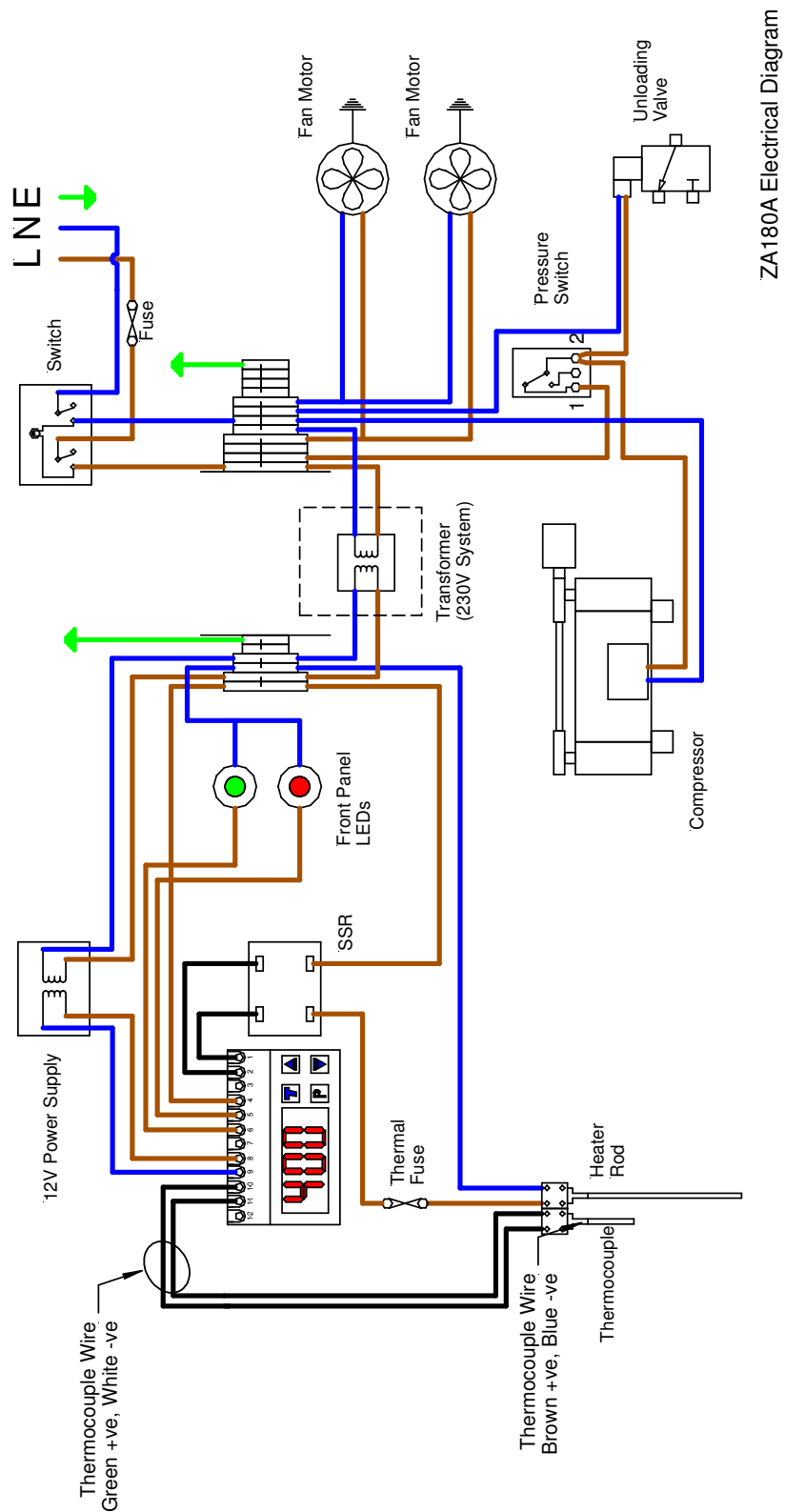
<u>Model</u>	<u>ZA015A-HP</u>
Max Output (Litres/min)	1.5
Heater Watts	450
Compressor Watts	250
Fan Watts	18.0
Electrical Requirements (230V 50Hz) (110V 60Hz)	3.1A 6.9A
Dimensions (H x W x D) cm Inches	88x43x41 39x17x16
Shipping Weight Kg Lbs	93.5kg 136lb

### Parts List

<u>Model</u>	<u>ZA015A-HP</u>
Compressor Inlet Filter Element	02-4187
AFD 3000 Elements (2off)	02-4335
Silencers (2off)	02-1033
Compressor Service Kit	06-5530
Unloading Valve (230V)	02-4334
Unloading Valve (110V)	02-4384
Pressure Switch	04-4411
Catalytic chamber	06-1075
Heater Element	04-1058
Thermocouple	04-1051
Temperature Controller	04-4459
Power Supply	04-4460
Solid State Relay (SSR)	04-4458
Cooling Fan (110V)	04-1022
Cooling Fan (230V)	04-1021
Transformer (230V Only)	04-4356

## 10 System Diagrams





ZA180A Electrical Diagram

## **Maintenance Log**

**Model-**\_\_\_\_\_

**Serial number**\_\_\_\_\_

<b>Work Done</b>	<b>Remarks</b>	<b>Date</b>	<b>Name</b>



## Notes