THERMOLEC

INSTALLATION INSTRUCTIONS FOR FANLESS MAKE-UP AIR MODEL NER

August 2014
VERSION 1.2

Please read instructions carefully before installation.

This NER unit is a fanless fresh air make-up package with an integrated back draft damper and washable filter which allows an easy setup with a minimum number of connections. One power connection is required to power the unit and another is required to power the fan (except on 240V single phase models). Please follow the wiring diagram included behind the cover for specific electrical wiring. Thermolec NER mini make up air units are available in standard sizes up to 35 kW of heat at voltages ranging from 120V single phase to 600V three phase, custom sizes are available upon request. Collar sizes range from 10" to 14". Fanless make up air models are specified as follows: **NER**-*collar-kW-voltage/phase,* e.g. a 20kW, 240V (single phase) unit with a 12" collar would be **NER-12-20-240/1**.
NOTE: There is no fan included with this unit.

Mechanical installation

Thermolec NER heaters are designed to be installed for horizontal airflow only. The control panel must be on either side of the cabinet and cannot be installed on the top or bottom. **DO NOT install unit vertically** (fig. 1). This unit is equipped with thermal cutouts on both the top *and* bottom of the unit which allows it to simply be rotated 180º to change the direction of airflow with no modifications to the fan or wiring, as seen in fig. 2. Before mounting the unit, determine the direction of airflow required and rotate the unit accordingly, as seen in fig.2.
NOTE: This unit is designed to preheat outdoor air and not reheat ambient air.

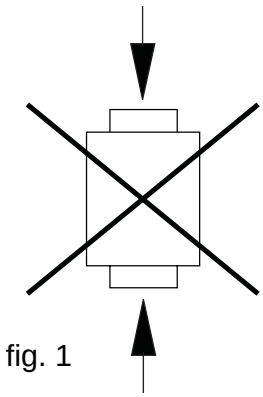


fig. 1

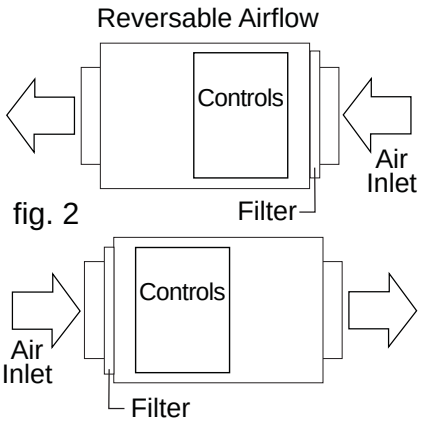
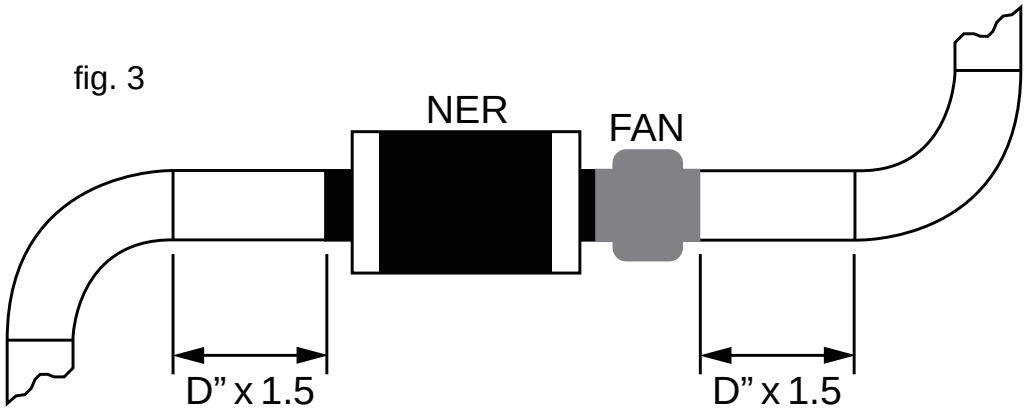


fig. 2

For proper airflow, a minimum distance between the unit and any elbow must be observed. This distance increases as the duct size increases. To determine the proper distance, multiply the collar size of the unit by a factor of 1.5. For example a unit with a 12" collar would require elbows to be installed at a distance of not less than 18" (fig. 3). Use round insulated duct for the inlet connection and uninsulated for the outlet while minimizing the use of elbows. When taking air directly from outside, install the inlet duct at an incline such that condensation or melted snow will not flow into the heater.

fig. 3



Attach the unit to a suitable support allowing a minimum 1/2” clearance above the heater. Always install the unit such that there is sufficient space to remove the cover and the damper assembly if necessary as well as to remove washable filter for cleaning (fig. 4). The hanger brackets provided (fig. 5) are designed to be used with threaded rods (not included). Springs may be added to the rods as an option to reduce vibration (not included).

fig. 4

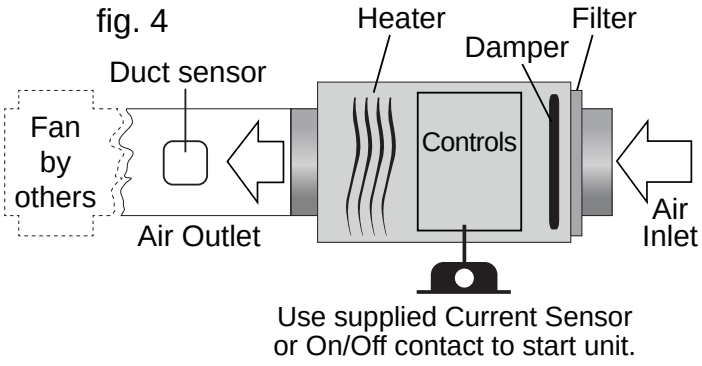
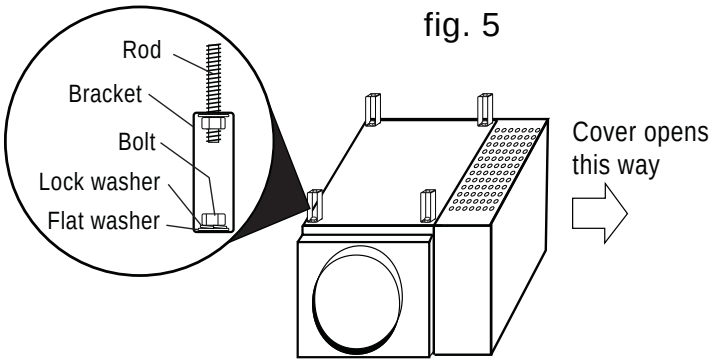


fig. 5



The minimum amount of air required (in cubic feet per minute) to operate the unit is 30 CFM per kW. A 10 kW unit will require 300 CFM. Actual CFM is based on the static pressure in the duct, for best results measure the static pressure and then refer to the documentation from the fan.

When there is a demand from the current sensor (or a dry contact), the electronic controller will close the dry contact on the fan relay and start heating. The duct sensor must be installed in the duct downstream from the mini make up air unit for proper operation. Adjust the blue square potentiometer on the D23-TF electronic controller with a small screwdriver to control the output temperature. Use the chart below the potentiometer to convert the temperature from Celsius to Fahrenheit.

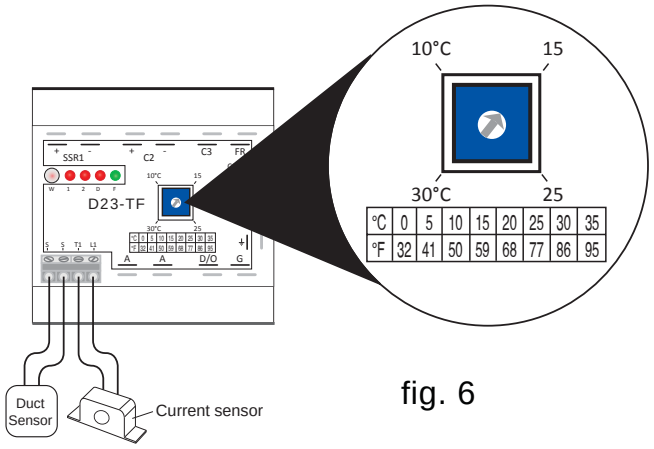


fig. 6

The duct sensor must be wired to the ‘S’ ‘S’ terminals on the D23-TF. The controller monitors the outlet temperature and alerts of abnormal conditions with a flashing light (W) that can be seen on the D23-TF controller, see Table A below. In the event of a heater failure, such as a tripped manual cutout, the controller will shutdown the unit to avoid circulating unheated outside air and the warning LED will start flashing. If for some reason the output temperature is too hot, to avoid a potentially dangerous situation, the controller will also shutdown the unit and flash the warning LED accordingly.

Table A

Number of Flashes	**Problem**
one	no heat or output temperature too low
two	output temperature too hot

NOTE: Maximum discharge temperature for NER models is 90 ºF (32 ºC).

Electrical installation

Disconnect all power sources before opening the control box and working within. This unit is equipped with a dry contact to switch a suitable relay (not included) based on the fan selected, 208/240V single phase NER models have a power supply included for the fan. Please conform to all local and national electrical codes for wiring. The system should be supplied by a separate cable, of appropriate gauge, and with appropriate protection. Use only wires suitable for 75ºC. Wires shall be sized accordingly to the Canadian Electrical Code or N.E.C. requirements. All wires must be brought through knock-outs. Install a breaker close to the unit according to the code unless a breaker is already built into the unit.

To quickly calculate the heater amperage use the following formulas:

Single phase: Amperage = Watts / Voltage.
e.g. 20 kW at 240V would be: 20,000/240 = 83.3 A

Three phase: Amperage = Watts / (1.732 x Voltage).
e.g. 10 kW at 600V/3 phase would be: 10,000/(1.732 x 600) = 9.6 A

The fan speed should be adjusted according to the application to compensate for the specific static pressure of the installation.

Current sensor instructions

Use the included current sensor to interlock the mini make up air with an exhaust fan. Simply run one of the power wires of the exhaust fan through the hole in the current sensor (fig. 7). Some fan amperages may be too low to switch the current sensor and multiple loops may be required (fig. 8). Run the fan and test the output of the current sensor to determine if multiple loops are required. For information on connections refer to the wiring diagram included with the mini make-up air.

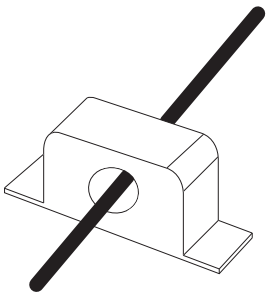


fig.7

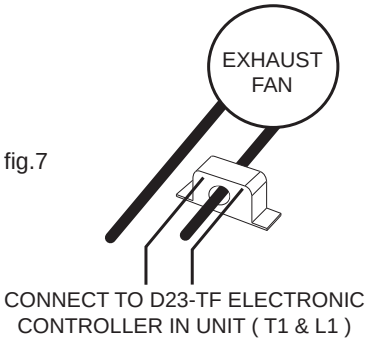
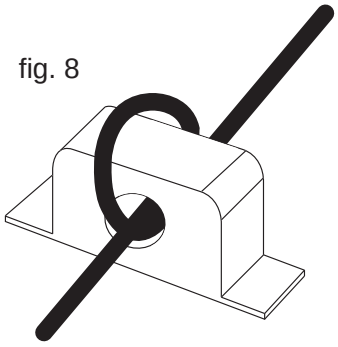
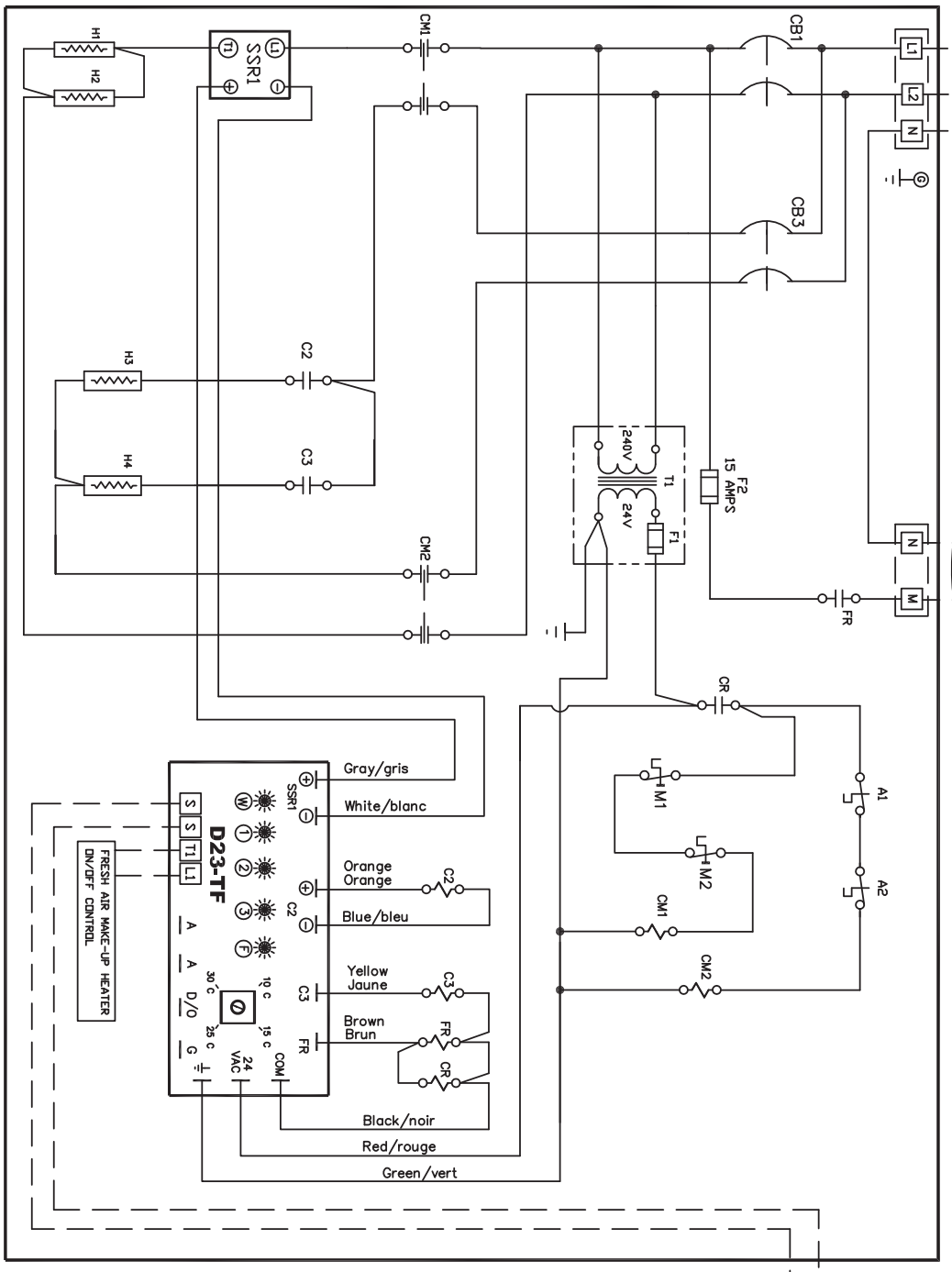


fig. 8



TYPICAL WIRING DIAGRAMS:

240/1 with neutral



LEGENDE

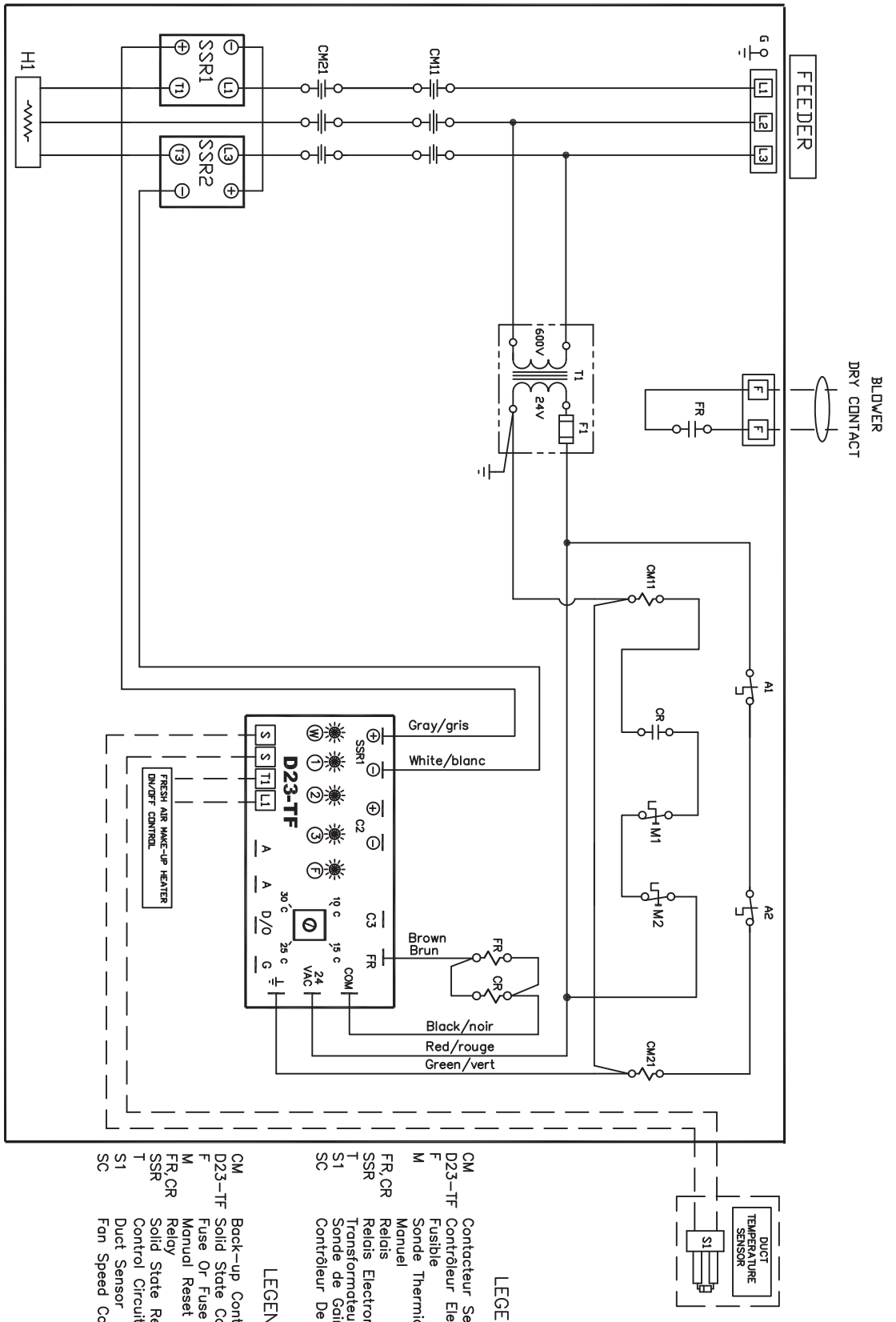
CM	Contacteur Secondaire
D23-TF	Contrôleur Electronique
F	Fusible
M	Sonde Thermique à Réenclenchement Manuel
FR,CR	Relais
SSR	Relais Electronique
T	Transformateur
S1	Sonde de Gaine
SC	Contrôleur De Vitesse
CB	Disjoncteur

LEGEND

M	Back-up Contactor to Manual
D23-TF	Solid State Controller
F	Fuse Or Fuse Link
M	Manual Reset Cut Out
FR,CR	Relay
SSR	Solid State Relay
T	Control Circuit Transformer
S1	Duct Sensor
SC	Fan Speed Controller
CB	Circuit Breaker

TYPICAL WIRING DIAGRAMS:

up to 600/3



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Maintenance

Even though Thermolec mini make up air units are designed to operate long term without problems we strongly recommend a yearly visual inspection. This precautionary step will help to keep your installation operating well. Note these eventual first signs of problems: signs of overheating on the heater frame, traces of water or rust on the control box.

A basic checklist would include:

- Check all fuses
- Check the resistance to ground for each circuit
- Check the resistance phase to phase for each circuit
- Check the tightening of connections at all contactors and heating elements
- Check all contactors

Any defective components should be replaced only with approved original parts.

Washable filter

Disconnect all power sources before doing any maintenance. This unit is equipped with a permanent filter that should be washed at regular intervals. Check the filter after a month of operation. To remove the filter, simply pull on the plastic tab (fig. 9). If the filter is extremely dirty, increase the frequency of inspection. Make sure that the filter is dry before replacing.

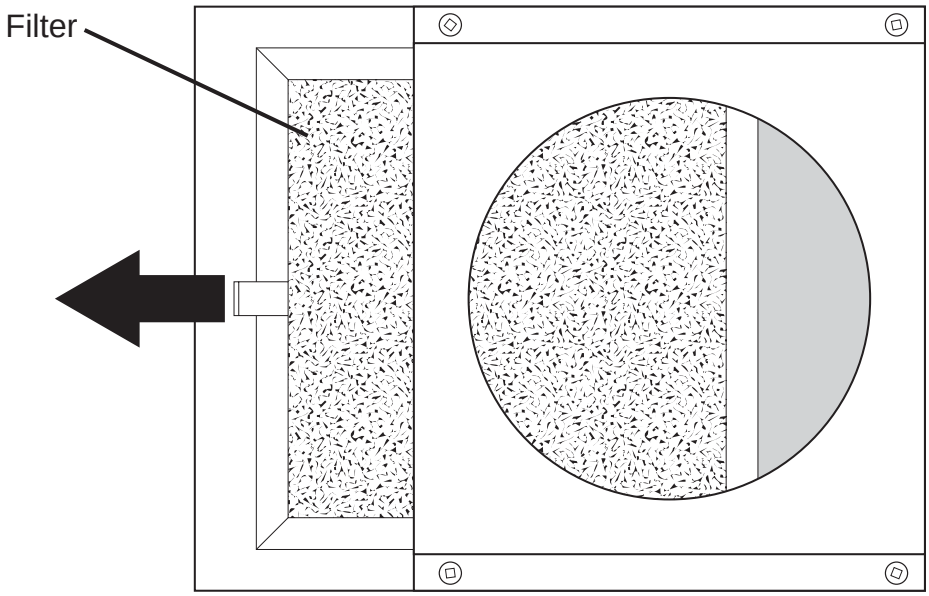

fig. 9

Warranty

1 - **THERMOLEC LTD** guarantees it's heater elements against any defect in workmanship and material for a period of two years and other built-in components for a period of one year, starting from the date of shipment from it's factory.
2 - **THERMOLEC LTD** will repair or replace without charge, in its factory or in the field at its own discretion, the unit or part, which upon manufacturer examination, is considered to be defective.
3 -Misuse of this product, or repairs made by others without **THERMOLEC LTD's** authorization, will void this warranty.
4 - **THERMOLEC LTD** shall not be held responsible for damage or delay and shall not be held liable for any charges resulting from the removal or replacement of the allegedly defective heater.
5 - **THERMOLEC LTD** shall not be held responsible for any incidental or consequential damage or delay due to workmanship or material. No additional charge will be accepted for repair, replacement or modification if prior written authorization was not obtained from **THERMOLEC LTD**.
6 -Any control device or accessory, supplied with the unit, to be mounted or connected remotely, will only be guaranteed by the manufacturer per conditions stated in paragraph 5.

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