



Instructions

IPC ELECTRONICS LTD.

THERMOPILE IPC-4652-W

IMPORTANT

Please read these instructions carefully
before using apparatus

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Thermopile IPC-4652-W

Introduction

A thermopile is made up of a number of thermocouple junctions connected in series to make a sensitive heat detecting device. If the sensitive area of the thermopile is directed towards a hot body (eg. a Leslie cube), the heat emitted from the body causes the thermopile to generate a voltage proportional to the amount of radiant heat detected.

Description

The thermopile element contains multiple junctions and has a 7mm x 0.7mm active area housed in a transistor type package. The thermopile element along with its amplifier is housed in a 140mm rod with a 400mm cable terminated with three 4mm plugs (red, black and white).

Connections

The thermopile requires an external DC supply between 7V to 25VDC, this supply is connected to the red and black 4mm plugs. For this application the IPC Student Power Supply (IPC-0256-P) would be ideal

The output voltage (DC) is via the white 4mm plug, to measure the output voltage connect the white plug to the positive input of a suitable voltmeter and the negative input of the voltmeter to the black plug (this also being connected to the negative of the DC supply). Depending on the level of temperature being measured the output voltage will range from millivolts to volts, the IPC 2VDC Digital Voltmeter (IPC-1904-M) would be ideal.

Note: supply voltages outside the range or reversed may result in the thermopile either not operating correctly or being permanently damaged.

Experiment (using a Leslie cube)

1. Connect the thermopile to a suitable power supply and voltmeter and then using a clamp position the thermopile a fixed distance from the Leslie cube.
2. Fill the Leslie cube with hot water and note the voltmeter reading with the thermopile directed at each face. Care must be taken to ensure that the cube-thermopile distance remains constant for each reading taken.
3. It will be seen that the largest reading is produced with the thermopile directed at the matt black surface of the cube and the smallest reading at the polished metal surface. This shows how different colours and finishes differ in their efficiency at radiating heat. In some cases spurious readings can occur due to different surface textures. A rough textured surface of a particular finish will produce a greater reading than a smooth surface of the same finish due to having a greater surface area over which to radiate heat.