

Engineering Sample Information  
MODULE ASSEMBLY  
2003 Nov 28

# HM177

## Electronic Simmerstat Control Module

INTEGRATED ELECTRONIC SOLUTIONS  
1 BUTLER DRIVE  
HENDON SA 5014  
AUSTRALIA



## Electronic Simmerstat Control Module

HM177

---

### CONTENTS

1	FEATURES
2	GENERAL DESCRIPTION
3	QUICK REFERENCE DATA
4	CONNECTIONS AND LAYOUT
5	CIRCUIT DIAGRAM
6	DIMENSIONS
7	FUNCTIONAL OVERVIEW
8	IMPORTANT ELECTRICAL SAFETY WARNING
9	REFERENCES
10	DEFINITIONS
11	IES INFORMATION
12	DISCLAIMER

# Electronic Simmerstat Control Module

# HM177

## 1 FEATURES

- Simple circuit configuration
- Provides full range 0% to 100% duty cycle control
- Duty cycle range can be set using external components
- Configurable for resistive (heating) or reactive load applications
- Unique “load current zero-crossing” switching minimises RFI due to triac switching
- Flexible programming of triac gate pulse width
- Logic input (MODE) provides interface to external logic functions
- Variants available for different switching periods
- Integrated supply circuit enables supply directly from the mains using a single low-power dropping resistor

## 2 GENERAL DESCRIPTION

The HM177 is an electronic simmerstat control module which has been designed to allow a variety of control applications to be satisfied by the choice of position and value of components on a printed circuit board assembly. Based on the OM1895 Simmerstat Control Integrated Circuit, it can be configured to a wide variety of simmerstat configurations. The OM1895 uses a unique “load current zero-crossing” technique to control triac firing, to minimise RFI due to triac switching. It is capable of being configured for heating or cooling applications. For example, the zero crossing switching of a resistive load, or for the control of inductive loads such as motors, compressors or fans.

The HM177 is available in a number of basic variants which are described in this document, as well as being able to be made to specific customer requirements.

The use of the OM1895 Simmerstat control IC allows a very simple application circuit, using minimum of components, and provides improved accuracy and reliability over mechanical solutions.

## 3 QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
V <sub>SUP</sub>	AC supply voltage	(note 1)	216	230	253	V
I <sub>SUP</sub>	control supply current	controller only	–	7	–	mA
I <sub>LOAD</sub>	load current	(note 2)	–	–	6	A
T <sub>stg</sub>	storage temperature range		–25	–	+85	°C
T <sub>amb</sub>	operating ambient temperature range	in free air	0	–	+45	°C

### Note

1. The operating voltage range can be set to any desired ac range by selection of power supply resistors. Application circuits are easily designed for 100–120V, or even an extended voltage range such as 100 to 250V.
2. The HM177 heatsink will permit load currents of up to 6 Amps if it is mounted with a reasonably free flow of air across the heatsink surface. Load currents up to 10Amps may be used with additional heat dissipating capability, together with triac temperature measurement in situ to demonstrate that under worst case ambient temperatures the triac junction temperature remains within ratings.

# Electronic Simmerstat Control Module

HM177

## 4 CONNECTIONS AND LAYOUT

External NTC connection (where used):

Molex 2-way connector 09-91-0200 with pin 08-50-0106 or

Oupiin 2-way connector 4771-02H with terminal pin 4771-pinT

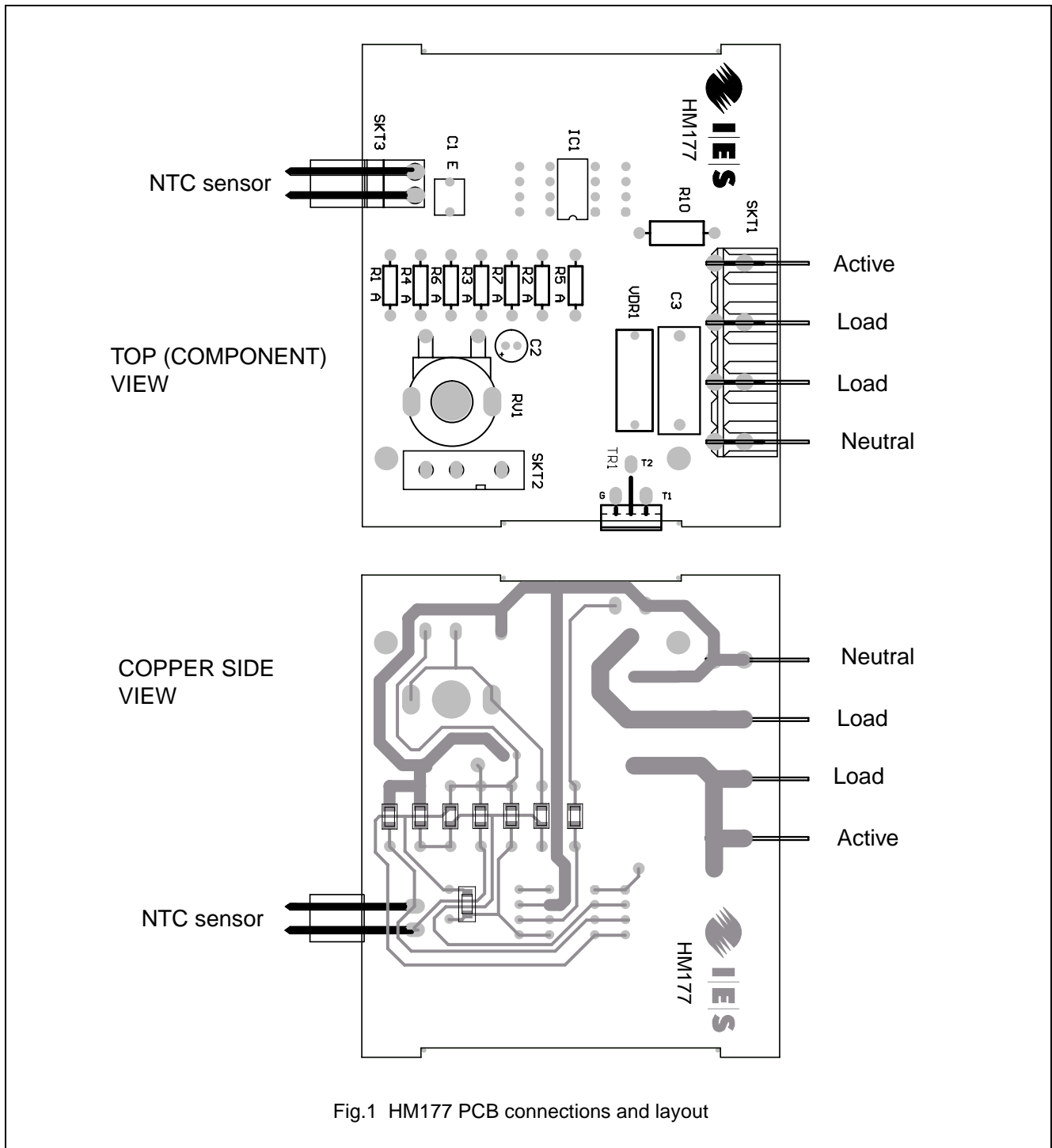


Fig.1 HM177 PCB connections and layout

# Electronic Simmerstat Control Module

HM177

CIRCUIT DIAGRAMS

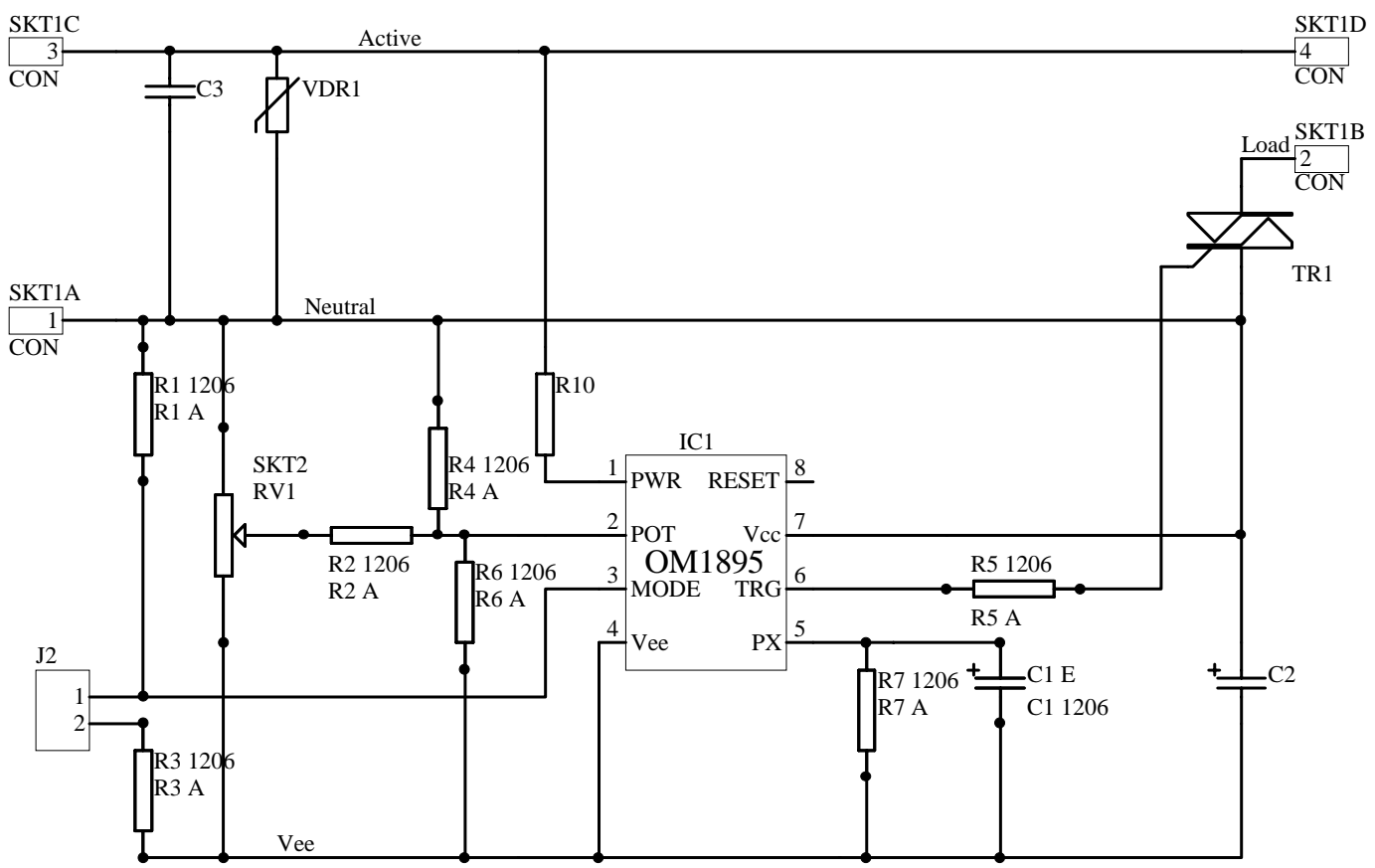
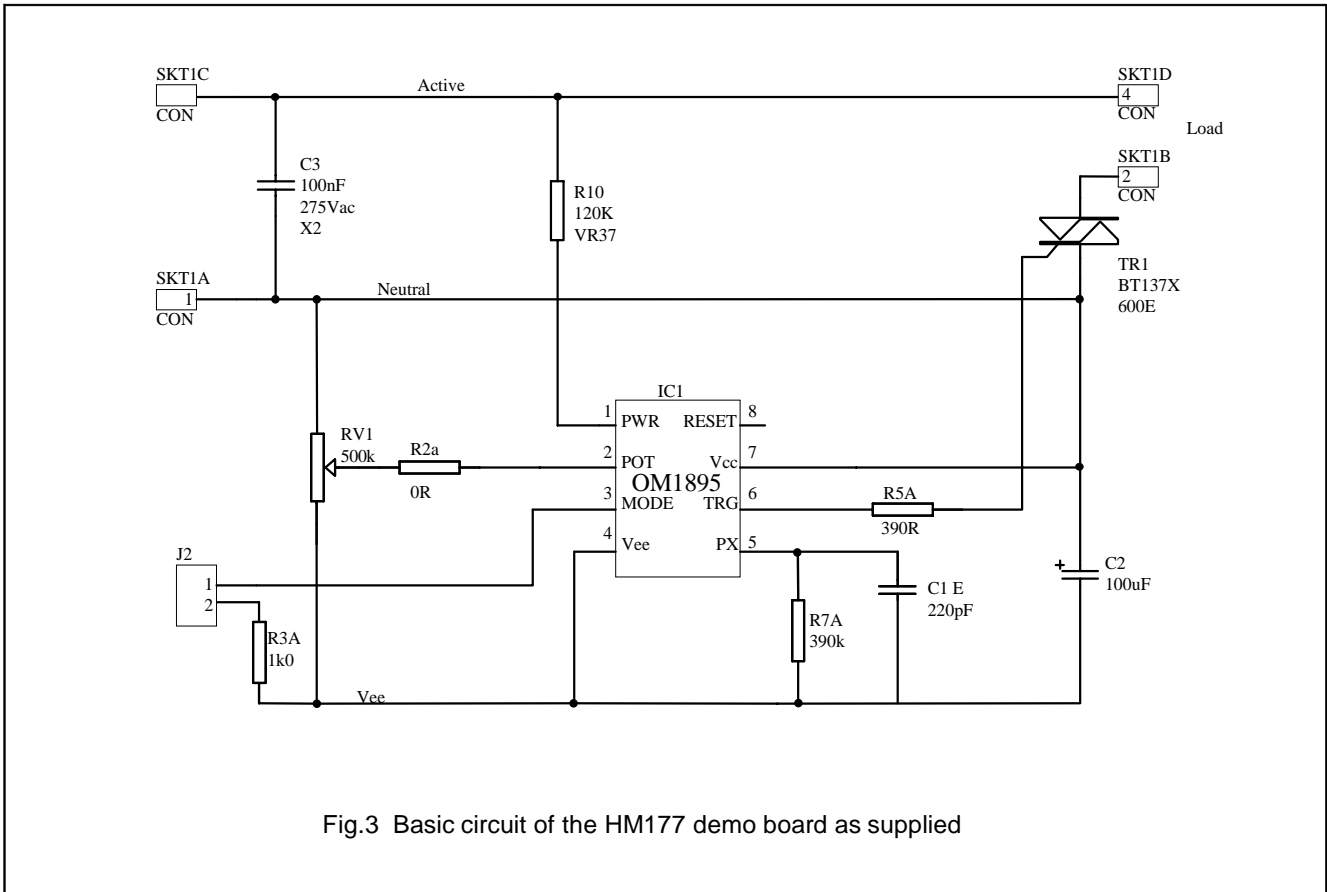


Fig.2 General HM177 circuit diagram

Electronic Simmerstat Control Module

HM177



# Electronic Simmerstat Control Module

HM177

## 6 DIMENSIONS

Dimensions: 104 x 95 mm.

Height (including the heatsink) 36 mm.

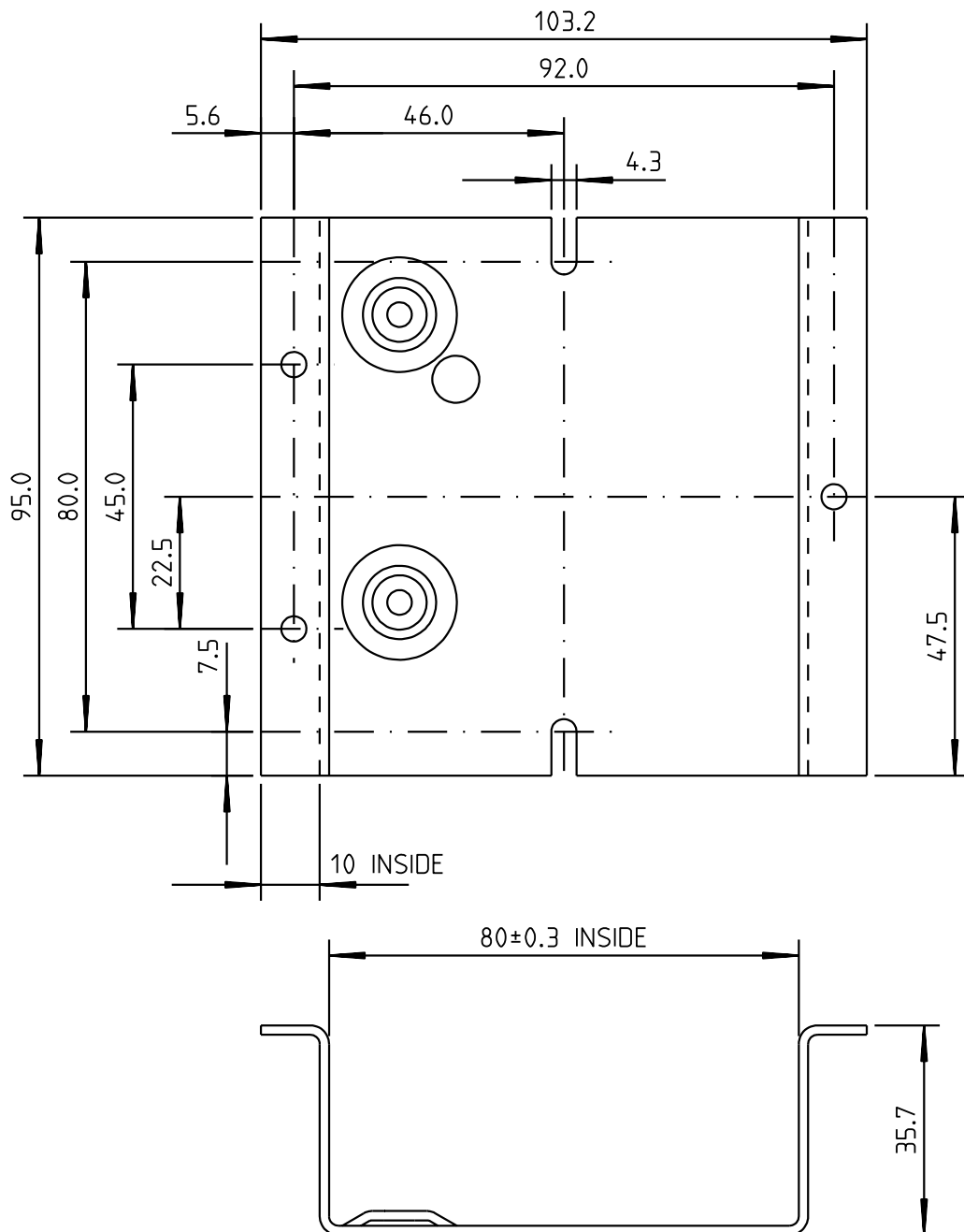


Fig.4 HM177 Dimensions.

---

## Electronic Simmerstat Control Module

HM177

---

### 7 FUNCTIONAL OVERVIEW

The HM177 electronic control module provides a general purpose core control module for triac control of a variety of applications.

The HM177 contains a zero-crossing triac driver OM1895 (IC1) for electronically controlling a load. The load function may be either heating or cooling (e.g. a hot water heating element, room heater, fan or a refrigeration compressor motor) and this load may be resistive or inductive in nature. The necessary changes to suit each load, and to set the switching conditions required, are made by selection and placement of additional components (mainly axial leaded resistors) on the basic HM177 control module.

The HM177 module is already assembled with an OM1895 IC, the timing & supply capacitors and a setting potentiometer.

For a detailed description of the functioning of the OM1895 integrated circuit refer to the Data Sheet "OM1895 Simmerstat control IC".

The OM1895 turns the triac ON for set duty cycle depending on the position of the potentiometer. The periods of the duty cycles are set by the version of the OM1895 IC used, i.e. OM1895A, OM1895B, OM1895C or OM1895D (Please refer to the OM1895 IC Data Sheet).

R4, R6, R2 allow for the use of the Control input function of the OM1895 IC (Please refer to the OM1895 IC Data Sheet).

R1, R3 and J2 allow for the use of the Triac ON/OFF function of the OM1895 IC (Please refer to the OM1895 IC Data Sheet).

### 8 IMPORTANT ELECTRICAL SAFETY WARNING

The HM177 circuit is connected to the mains electrical supply and operates at voltages which need to be protected by proper enclosure and protective covering. While it has been designed to conform to relevant Australian and overseas Standards (such as AS3300 and AS3313), it should only be used in a manner that ensures the appliance in which they are used complies with all relevant safety and other requirements.

The board must be mounted with non-conductive clips, and positioned such that the minimum creepage distances from the circuit assembly to earth, and between high voltage points is not transgressed.

In applications where an NTC is used, the NTC element is electrically live and connected to the mains, and therefore must be electrically insulated. Also creepage distances must be maintained for all live parts in the circuit and its wiring, especially with respect to the NTC thermistor.

It should be noted that there are Mains Voltages on the circuit board. Adequate labelling should be attached to warn service personnel, and others, that this danger exists.

The control board assembly must be mounted, preferably with the heatsink vertical, with sufficient free air flow across its surface to prevent the heat dissipated in a number of critical components from causing an unacceptable rise in the ambient temperature.

The board should be mounted in a place that is clean and dry at all times, not subject to condensation or the accumulation of dust and other contaminants.

### 9 REFERENCES

- Data Sheet - OM1895 Simmerstat Control IC

## Electronic Simmerstat Control Module

HM177

**10 DEFINITIONS**

<b>Data sheet status</b>	
Engineering sample information	This contains draft information describing an engineering sample provided to demonstrate possible function and feasibility. Engineering samples have no guarantee that they will perform as described in all details.
Objective specification	This data sheet contains target or goal specifications for product development. Engineering samples have no guarantee that they will function as described in all details.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later. Products to this data may not yet have been fully tested, and their performance fully documented.
Product specification	This data sheet contains final product specifications.
<b>Limiting values</b>	
Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
<b>Application information</b>	
Where application information is given, it is advisory and does not form part of the specification.	

**11 IES INFORMATION**

INTEGRATED ELECTRONIC SOLUTIONS PTY. LTD.  
 ABN 17 080 879 616

Postal address:

Integrated Electronic Solutions  
 PO Box 2226  
 Port Adelaide SA 5015  
 AUSTRALIA

Street Address:

Integrated Electronic Solutions  
 1 Butler Drive  
 Hendon SA 5014  
 AUSTRALIA

Telephone: +61 8 8348 5200  
 Facsimile: +61 8 8243 1048

World Wide Web: [www.ies-sa.com](http://www.ies-sa.com)

Email: [IES@ies.sa.com.au](mailto:IES@ies.sa.com.au)

---

## Electronic Simmerstat Control Module

HM177

---

### 12 DISCLAIMER

Integrated Electronic Solutions Pty. Ltd. (IES) reserves the right to make changes to both its products and product data without notice.

IES makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does IES assume any liability arising out of the use or application of any IES product. IES specifically disclaims any and all liability, including without limitation incidental or consequential damages.

Typical performance figures, where quoted may depend on the application and therefore must be validated by the customer in each particular application. It is the responsibility of customers to ensure that any designs using IES products comply with good practice, applicable standards and approvals. IES accepts no responsibility for incorrect or non-compliant use of its products, failure to meet appropriate standards and approvals in the application of IES products, or for the correct engineering choice of other connected components, layout and operation of IES products.

Any customer purchasing or using IES product(s) for an unintended or unauthorised application shall indemnify and hold IES and its officers, employees, related companies, affiliates and distributors harmless against all claims, costs, damages, expenses, and reasonable legal fees arising out of, directly or indirectly, any claim of loss, personal injury or death associated with such unintended or unauthorised use, even if such claim alleges that IES was negligent regarding the design or manufacture of the relevant product(s).

#### Life Support Applications:

Products of Integrated Electronic Solutions Pty. Ltd. (IES) are not designed for use in life support appliances, devices or systems, where malfunction can result in personal injury. Customers using or selling IES products for use in such applications do so at their own risk and agree to fully indemnify IES for any damages resulting from such improper use or sale.