



Brimbank
City Council



Brimbank Energy Saver Kit

Equipment guide and operating manuals

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Energy Saver Kit Equipment Guide

Thermometer



Use the thermometer to measure ambient air temperature. Lines indicate the optimum temperature for energy efficiency and savings in the fridge (3 to 5°C) and freezer (-18 to -15°C), as well as room temperature in summer (24 to 27°C) and winter (16 to 18°C).

How to use

1. Place thermometer inside the fridge, freezer or in the middle of the room.
2. Check temperature after 15-30 minutes.
3. Note the result and adjust fridge, freezer or room temperature settings higher or lower as needed.

Compass



Use the compass to work out the orientation of rooms in your house. Knowing which sides face west and north can help you keep cool in summer and save on air conditioning.

How to use

1. Hold the compass flat in your palm and rotate until the red needle aligns with the 'N'. This is now indicating north.
2. Repeat process with 'W' to find West facing direction.
3. Consider changes you can make to shade the west side of your house, and let the sun in on the north side. See books included in this kit for more information about home design and orientation and how to maximise efficiency based on your home's existing orientation.

Energy Saver Kit Equipment Guide

Water flow measuring cup



Use the water flow measuring cup to find out the flow rate in litres per minute (L/min) for shower heads and taps in your house. High

water efficiency is considered to be 6L/min or less for showers and 4L/min or less for taps. Measuring the flow rate can help you determine if a more efficient shower head or tapware is needed. This will not only save water but can also lead to significant energy savings, particularly in the shower, because less hot water needs to be heated.

How to use

1. Set a timer to five seconds.
2. Turn the water on full force and collect water in the cup for exactly five seconds.
3. Using the guide, measure the quantity of water in the cup.

If you measure a high flow rate, consider replacing your tap to a **6 Star tap (4L/min)**, and consider replacing your showerhead with a **4 Star showerhead (6L/min)**.

See the **Water Efficiency Label Scheme** for more information at waterrating.gov.au

Digital Infrared Thermometer



Use the Digital Infrared Thermometer to test the surface temperature of draughty areas of your home including around windows, window frames and door frames. You can also test areas of your home which may require improved insulation including floors, walls, wall areas above windows and ceilings.

How to use

1. Point the thermometer at the surface you wish to measure and pull the trigger.
2. Note the temperature on the thermometer screen.
3. Compare the temperature of different parts of each room. Colder areas in winter show where you may be losing heat to the outside. Warmer areas in summer show where you may be gaining heat from the outside.

Refer to Sustainability Victoria guides at QR codes to below for practical measures you can take to seal draughts and improve insulation.

Guide to Draught Proofing



Guide to Insulation



Energy Saver Kit Equipment Guide

Power-Mate Lite energy monitor

Use the Power-Mate Lite energy monitor to measure how much electricity each appliance in your home uses, how much they cost to run and how much greenhouse gas emissions it takes to power them. See the quick user guide below to get started or refer to the full user manual attached to this kit.



Quick start guide

1. Plug the energy monitor into the wall power point socket.
2. Plug an appliance into the piggy-back plug of the energy monitor and switch the appliance on at the power point.
3. Reset the monitor before you start your measurement. Hold the RUN button on the energy monitor until CONFIRM CLR DATA screen appears, select YES. **It is important to do this step before each new measurement.**
4. Set the electricity cost rate by holding MENU until the SET COST screen appears. You can find your electricity usage rate on your bill. The average usage rate in Victoria in 2022 is around 21c/kWh. Press RUN to switch through digits and ZOOM to change the number. Press MENU when complete.
5. Press the RUN button to start a new measurement. Scroll through COST, G/GAS (emissions) and ENERGY results by pressing the MENU button. Results are displayed at the following intervals: REAL (the amount of time you have measured for), HOUR, QTR (three months) and YEAR.
6. The type of reading you take will depend on the type of appliance you're measuring and how it runs:
 - For items which **run when needed such as a kettle**, or **on a cycle such as a washing machine**, you will need to take a reading of one full use. Press RUN at start of use and press RUN again when complete. The monitor readout for REAL is the measure of a single use.
 - For appliances which **are used throughout the day with varied power use, such as a fridge, computer or TV**, run the timer for a 24 hour period. The REAL readout is a measure of how much power is used each day.
 - To assess how much power is being used by items on stand-by, measure for a short interval of five minutes to provide accurate of hourly, quarterly and yearly results.

Now that you know how much energy appliances use, you can make changes to your energy use to reduce your bill and environmental impact. Options include switching off power points while not in use, washing clothes in cold water, and if your home is on a smart metre, run appliances such as dishwashers or washing machines in off-peak power times. Some simple actions can save hundreds of dollars a year. For example:

- Getting rid of the second fridge could save around \$172 a year.
- Switching off a game console after use could save up to \$193 a year.
- Using the clothes line once a week instead of using the dryer could save around \$79 a year.

Buying energy efficient appliances when it's time to upgrade can save hundreds of dollars over time. Check the energy rating label when you buy and see the **Energy Rating Label** website at for more information at energyrating.gov.au

Infrared Thermometer

Operating Manual

INTRODUCTION

Thank you for purchase of the IR Thermometer. This is capable of non-contact (infrared) temperature measurements at the touch of a button. The built-in laser pointer increases target accuracy while the backlight LCD and handy push-buttons combine for convenient, ergonomic operation.

The Non-contact Infrared Thermometers can be used to measure the temperature of objects' surface that is improper to be measured by traditional (contact) thermometer (such as moving object, the surface with electricity current or the objects which are uneasy to be touched.)

Proper use and care of this meter will provide years of reliable service.

FEATURES:

- Rapid detection function
- Precise non-contact measurements
- Dual laser sighting
- Unique flat surface, modern housing design
- Automatic Data Hold
- °C/°F switch
- Emissivity Digitally adjustable from 0.10 to 1.0
- MAX temperature displays
- Backlight LCD display
- Automatic selection range and Display Resolution 0.1°C (0.1°F)
- Trigger lock
- Set high and low alarms

WIDE RANGE APPLICATION:

Food preparation, Safety and Fire inspectors, Plastic molding, Asphalt, Marine and Screen printing, measure ink and Dryer temperature, HVAC/R, Diesel and Fleet maintenance.



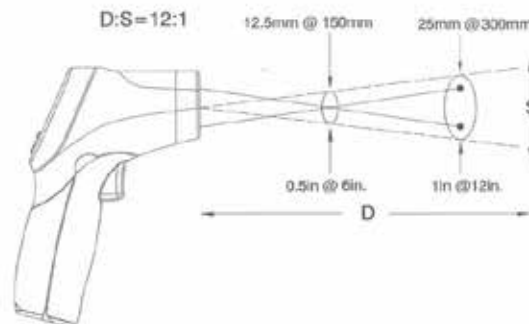
SAFETY

- Use extreme caution when the laser beam is turned on.
- Do not let the beam enter your eye, another person's eye or the eye of an animal.
- Be careful no to let the beam on a reflective surface strike your eye.
- Do not allow the laser light beam impinge on any gas which can explode.



Distance & Spot Size

As the distance (D) from the object increases, the spot size (S) of the area measured by the unit becomes larger. The relationship between distance and spot size for each unit is listed below. The focal point for each unit is 914mm (36"). The spot sizes indicate 90% encircled energy.



1. SPECIFICATIONS

	Temperature range	D: S
	-50 to 650 °C (-58°F ~ 1202°F)	12:1
Display resolution	0.1 °C (0.1°F)	<1000
	1°F	>1000

Accuracy for targets:

Assumes ambient operating temperature of 23 to 25 °C (73 to 77°F)

-50 ~ 20°C (-58°F ~ 68°F)	±2.5°C (4.5°F)
20°C ~ 300°C (68°F ~ 572°F)	±1.0% ±1.0°C (1.8°F)
300°C ~ 650°C (572°F ~ 1202°F)	±1.5%

Repeatability

-50~20°C (-58~68°F)	: ±1.3°C (2.3°F)
20~650°C (68~1202°F)	: ±0.5% or ±0.5°C (0.9°F)

Response time	150ms
Spectral response	8~14um
Emissivity	Digitally adjustable from 0.10 to 1.0
Over range indication	LCD will show "----"
Polarity	Automatic (no indication for positive polarity); Minus (-) sign for negative polarity
Diode laser	output <1mW, Wavelength 630~670nm, Class 2 laser product
Operating temp.	0 to 50°C (32 to 122°F)
Storage temp.	-10 to 60°C (14 to 140°F)
Relative humidity	10%~90%RH operating, <80%RH storage
Power supply	9V battery, NEDA 1604A or IEC 6LR61, or equivalent

Note:

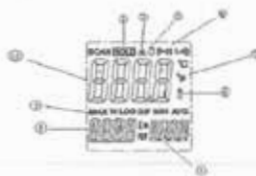
- **Field of View:** Make sure that the target is larger than the unit's spot size. The smaller the target, the closer you should be to it. When accuracy is critical, make sure the target is at least twice as large as the spot size.

2. FRONT PANEL DESCRIPTION

- ① IR sensor
- ② LCD Display Laser pointer beam
- ③ up button
- ④ down button
- ⑤ mode button
- ⑥ Measurement Trigger
- ⑦ Battery Cover
- ⑧ Handle Grip

**3. INDICATOR**

- ① Data hold
- ② Laser "on" symbols
- ③ Lock symbol
- ④ High alarm and low alarm symbol
- ⑤ °C/°F symbol
- ⑥ Low power symbols
- ⑦ Emissivity symbol and value
- ⑧ Temperature values for the MAX
- ⑨ Symbols for MAX
- ⑩ Current temperature value

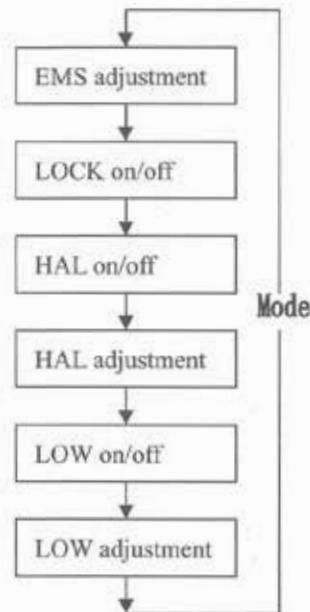
**4. Buttons**

- ① Up button (for EMS, HAL, LAL)
- ② Down button (for EMS, HAL, LAL)
- ③ MODE button
(for cycling through the mode loop)

**Functional Design**

- the switches of C/F sat in a cell switching
- In the measuring time up, down keys to adjust the Emissivity.
- IN the hold time, up keys to turn on or off the laser
Down keys to turn on or off the backlight
- To set values for the High Alarm (HAL), Low Alarm (LAL) and Emissivity (EMS), press the MODE button until the

appropriate code appears in the display, press the UP and down buttons to adjust the desired values.

**MODE Button Function**

Press the mode button also allows you to access the set state, Emissivity(EMS), Lock on/off, HAL on/off, HAL adjustment, LOW on/off, LOW adjustment. Each time you press set you advance through the mode cycle. The diagram shows the sequence of functions in the mode cycle.

EMS adjustment. The Emissivity(EMS) digitally adjustable from 0.10 to 1.0, LOCK on/off. The lock mode is particularly useful for continuous monitoring of temperatures. Press the up button or down button to turn on or off. Press the Measurement Trigger to confirm the lock measurement mode. The IR Thermometer will continuously display the temperature until press again the Measurement Trigger.

In lock mode, press the up button or down button adjustable the Emissivity. HAL (LOW) on/off. Press the up button or down button to turn on or turn off. Press the Measurement Trigger to confirm the High(Low)alarm mode. Hal(LOW) adjustment. The high(Low) alarm adjustable form

-50 to 650 °C(-58°F ~ 1202°F)

Switching C/F

Select the temperature units (°C or °F) using the °C/°F switch (①)



Max indicate the max record that displays between the pressing and releasing the "ON/OFF" button each time

MEASUREMENT OPERATION

- ① Hold the meter by its **Handle Grip** and point it

Infrared Thermometer

Operating Manual

toward the surface to be measured.

- ② Pull and hold the **Trigger** to turn the meter on and begin testing. The display will light if the battery is good. Replace the battery if the display does not light.
- ③ Release the Trigger and the HOLD display icon will appear on the LCD indicating that the reading is being held. In HOLD status, press the UP button to turn on or off the laser. And press the DOWN button to turn on or off the backlight.
- ④ The meter will automatically power down at approximately 7 seconds after the trigger is released. (Unless the unit is locked on)

Note: Measurement considerations

Holding the meter by its handle, point the IR Sensor toward the object whose temperature is to be measured. The meter automatically compensates for temperature deviations from ambient temperature. Keep in mind that it will take up to 30 minutes to adjust to wide ambient temperatures are to be measured followed by high temperatures (30 minutes) is required after the low (and before the high) temperature measurements are made.

This is a result of the cooling process, which must take place for the IR sensor.

5. BATTERY REPLACEMENT

- ① As battery power is not sufficient, LCD will display " " replacement with one new battery type 9V is required.



- ② Open battery cover, then take out the battery from instrument and replace with a new 9-Volt battery and place the battery cover back.

6. NOTES:

• How it Works

Infrared thermometers measure the surface temperature of an object. The unit's optics sense emitted, reflected, and transmitted energy, which is collected and focused onto a detector. The unit's

electronics translate the information into a temperature reading, which is displayed on the unit. In units with a laser, the laser is used for aiming purposes only.

• Field of View

Make sure that the target is larger than the unit's spot size. The smaller the target, the closer you should be to it. When accuracy is critical, make sure the target is at least twice as large as the spot size.

• Distance & Spot Size

As the distance (D) from the object increases, the spot size (S) of the area measured by the unit becomes larger. See: Fig: 1.

• Locating a hot Spot

To find a hot spot aim the thermometer outside the area of interest, then scan across with an up and down motion until you locate hot spot.

• Reminders

- ① Not recommended for use in measuring shiny or polished metal surfaces (stainless steel, aluminum, etc.). See **Emissivity**
- ② The unit cannot measure through transparent surfaces such as glass. It will measure the surface temperature of the glass instead.
- ③ Steam, dust, smoke, etc., can prevent accurate measurement by obstructing the unit's optics.

• Emissivity

Emissivity is a term used to describe the energy-emitting characteristics of materials.

Most (90% of typical applications) organic materials and painted or oxidized surfaces have an emissivity of 0.95 (pre-set in the unit). Inaccurate readings will result from measuring shiny or polished metal surfaces. To compensate, cover the surface to be measured with masking tape or flat black paint. Allow time for the tape to reach the same temperature as the material underneath it. Measure the temperature of the tape or painted surface.

Emissivity Values

Substance	Thermal emissivity	Substance	Thermal emissivity
Asphalt	0.90 to 0.98	Cloth (black)	0.98
Concrete	0.94	Human skin	0.98
Cement	0.96	Lather	0.75 to 0.80
Sand	0.90	Charcoal (powder)	0.96
Earth	0.92 to 0.96	Lacquer	0.80 to 0.95
Water	0.92 to 0.96	Lacquer (matt)	0.97
Ice	0.96 to 0.98	Rubber (black)	0.94
Snow	0.83	Plastic	0.85 to 0.95
Glass	0.90 to 0.95	Timber	0.90
Ceramic	0.90 to 0.94	Paper	0.70 to 0.94
Marble	0.94	Chromium oxides	0.81
Plaster	0.80 to 0.90	Copper oxides	0.78
Mortar	0.89 to 0.91	Iron oxides	0.78 to 0.82
Brick	0.93 to 0.96	Textiles	0.90

7. MAINTENANCE

- Repairs or service are not covered in this manual and should only be carried out by qualified trained technician.
- Periodically, wipe the body with a dry cloth. Do not use abrasives or solvents on this instrument.
- For service, use only manufacturer's specified parts.



Power-Mate Lite “Quick-Start”

Operating Manual

Power-Mate Lite “Quick-Start” Operating Instructions

Warning: This product contains live mains voltages and should be used only by an adult or under adult supervision. If the power cord or case becomes damaged, please return to either the manufacturer or an authorised service company for repair. Do not use in wet areas or if the unit becomes wet.



Introduction

The Power-Mate Lite (PML) reveals Running cost, Energy use, Greenhouse Gas (G/Gas) all expected Meter readings (including VA & PF) and it has a selectable timer function built in for taking readings over a preset period.

Terms used in this manual

The Power-Mate Lite (PML) screen shows multiple lines of data at the same time.

There are 3 buttons, which you either “click” with a short press or “hold” with a long press.

The “Zoom” button selects a line to magnify by clicking, or zooms into the line by holding.

The “Menu” button changes between the screens for Cost, Greenhouse Gas, Energy, Meter and Timing by clicking, or enters the setting mode for Cost, G/Gas and the Timer screen by holding.

The “Run” button starts, stops or pauses a measurement by clicking the button or resets the meter and clears all data by holding.

In the Time screen, a convenient count-down timer can be set by choosing between 9 selectable preset times or “Not Set”. If “Not Set ” is chosen, the Timer counts time up from zero and the display shows the total measurement elapsed time or **Runtime**. If a time period is selected though, the display then shows the time remaining or **Endtime** for the measurement.

Entering initial Cost and Greenhouse Gas (G/Gas) data

When delivered from new, the Power-Mate Lite will be prompting you to enter the cost value of your electricity when power is first applied. To obtain best accuracy, the cost must be entered in cents per kilowatt-hour (kWh) from your energy providers’ most recent account.

Note: 1) Some energy providers refer to kWh as units. PML’s are shipped preset to 18c/kWh.

2) You must first be in either the Cost or G/Gas screens to be able to set their values, then simply hold the “menu” button depressed until the “Set” screen is displayed.

To modify the Cost or G/Gas value, click the Zoom button to change the number (this cycles through 0-9). Clicking the Run key moves to the next digit, like setting a typical digital clock.

Similarly, enter the greenhouse gas coefficient, which can be found on the website: www.climatechange.gov.au/ table #39 which is measured in kg CO₂-e/kWh.

Note: the G/Gas coefficient varies from state to state – look to “**Table 5:** Indirect (scope 2) emission factors for consumption of purchased electricity from the grid” for your state’s value. If accurate figures are not available, 1.0kg CO₂-e/kWh can be used as a reasonable approximation (units come shipped with the G/Gas value pre-set to 1.0kg CO₂-e/kWh).

Display

The Cost, G-Gas and Energy screens simultaneously provide four lines of information, shown in order here:

- 1) The real (or actual) figure to date (since the measurement was started).
- 2) The estimated Hourly amount.
- 3) The estimated Quarterly amount.
- 4) The estimated Yearly amount

These estimated amounts are calculated from the average energy consumption of the appliance, derived from the data collected during a measurement period.

The Meter screen displays simultaneously True Power (W), Apparent Power (VA), Volts (V), Amps (A), Power-Factor & Frequency (Hz). Using “Zoom”, the meter screen also displays minimum and maximum values for V, A, W & VA

Note: the minimum and maximum figures will not be updated if the PML is stopped or paused.

A click of the Run key will start or stop a measurement period, whilst a hold will reset (clear) the data in the PML. When the PML is running, a flashing triangle icon shows on the top right corner of the LCD.

If the power fails during a measurement period, data is not lost and the PML resumes when power returns, another icon though will show next to the run icon showing that the power was disconnected.

Making your first measurement

Plug an appliance into the piggy-back plug of the PML and switch on the appliance. If you are not on the cost screen, click the menu button a few times until cost is displayed.

Now hold the Run button until prompted “clear all data” click the button under “Yes”. Now click the Run button to start your measurement. The cost screen will instantly update with the running cost data for the appliance.

Note: devices with a thermostat, like a fridge, should be measured over a 24Hr period to obtain the best accuracy.

Complete operating instructions and specifications can be downloaded from:

www.power-mate.com.au

Overload

When the current exceeds 10A, the display flashes the message:

“WARNING, OVERLOAD”, turn off or disconnect the excessive load as soon as possible to avoid overloading and damaging the Power-Mate.

Power-Mate Lite “Quick-Start”

Operating Manual

Specifications

NOTE: This unit is intended for operation @ 240Volts AC with a maximum load current of 10Amps.

Setting	Range	Units	Resolution	Units
Rate Setting	0 – 99.999	c/kWh		
G/Gas Setting	0 – 9.999	kg/kWh		
Inbuilt Timer	1, 8, 12, 24	Hours		
	2, 5, 7, 14, 28	Days		
Cost	0 – 999999	± \$	0.01	c
Energy	0 – 99999	± kWh	0.01	kWh
G-Gas	0 – 99999	± kg	0.01	g
Volts	170.0 – 270.0	V _{RMS}	0.1	V
Amps	00.000 – 10.000	A _{RMS}	0.001	A
Power	0 – 2,400.0	± W	0.1	W
Apparent Power	0 – 2,400.0	VA	0.5	W
Power Factor	± 0.001 to 1	(dimensionless)	Leading/Lagging	
Frequency	45-65	Hz	0.1	Hz
Run-time measurement	99:23:59:59	Days:Hours:Min.:Sec.		

Accuracy error for all ranges is better than 2%, (typical accuracy error is better than 1%)

Note 1: The VA and Power Factor accuracy is as specified when measuring above 2W.

Note 2: Where more digits are displayed than the resolution specified, the accuracy of any extra displayed digits is not guaranteed.

Warranty:

This product is guaranteed against faulty components and workmanship for a period of 12 months from the date of purchase. It is the responsibility of the purchaser to return the unit to the manufacturer or place of purchase with a copy of the sales receipt or invoice when requesting warranty repairs to be undertaken.

After the warranty repairs or work is completed, the manufacturer will return the goods to the purchaser using the Australian Post standard parcel service at no extra cost to the purchaser. If insurance or registered or express post is required, the cost shall be borne by the purchaser.

The Manufacturer is not responsible for goods lost or damaged by the Australian Post service. Great care was taken to ensure the integrity of data and information and correct operation of this product. The Manufacturer though will not accept any claims for data loss, financial loss or any other losses or consequential damage resulting from the data, use or failure to perform of this product, no other guarantees are implied or given.

To obtain warranty service on your Power-Mate Lite, please send it, together with your full name and return address, directly to the manufacturer:

Computer Control Instrumentation

A division of Hendon Semiconductors

1 Butler Drive

Hendon 5014

South Australia

Ph: (08) 8373 6611 Fax: (08) 8373 2311

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Post PO Box 70, Sunshine, VIC 3020

Hearing or speech impaired?

- TTY dial 133 677
- Speak & Listen 1300 555 727
- www.relayservice.gov.au, then enter 03 9249 4000



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131 450
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Use Brimby, the online virtual assistant
brimbank.vic.gov.au

www.brimbank.vic.gov.au