K8026

ILLUSTRATED ASSEMBLY MANUAL H8026IP'1

3.5A DIMMER WITH POTENTIOMETER

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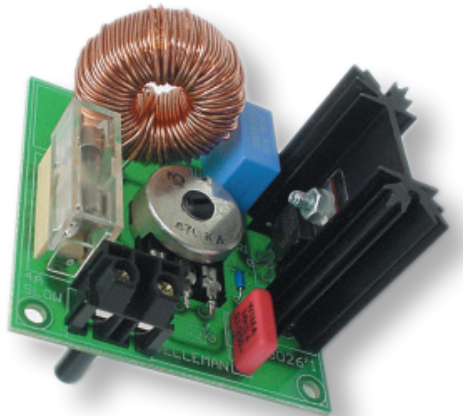
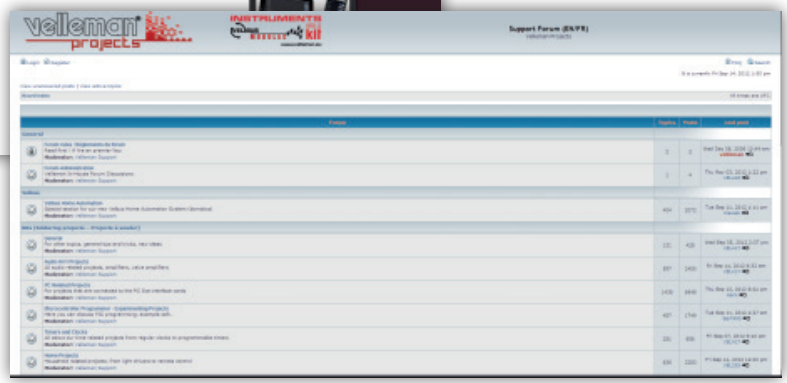


Due to its small size, this small dimmer easily replaces an existing switch, permitting you to vary the brightness of a light or group of lights. The dimmer may also be used to adjust the speed of a motor, vacuum cleaner, or any other motor with carbon brushes. A mains suppresser is provided eliminating undesirable RFI. It is not suitable for halogen lamps.

Specifications

- protected against induction voltage peaks
- Load: 3.5A (750W at 230V and 380W at 110V)
- suppressed according to EN55015
- PCB dimensions: 60 x 60mm / 2.4 x 2.4"



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assembly hints

1. Assembly (Skipping this can lead to troubles !)

Ok, so we have your attention. These hints will help you to make this project successful. Read them carefully.

1.1 Make sure you have the right tools:

- A good quality soldering iron (25-40W) with a small tip.
- Wipe it often on a wet sponge or cloth, to keep it clean; then apply solder to the tip, to give it a wet look. This is called 'thinning' and will protect the tip, and enables you to make good connections. When solder rolls off the tip, it needs cleaning.
- Thin raisin-core solder. Do not use any flux or grease.
- A diagonal cutter to trim excess wires. To avoid injury when cutting excess leads, hold the lead so they cannot fly towards the eyes.
- Needle nose pliers, for bending leads, or to hold components in place.
- Small blade and Phillips screwdrivers. A basic range is fine.

For some projects, a basic multi-meter is required, or might be handy.

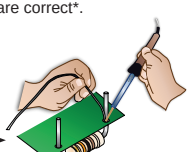
1.2 Assembly Hints :

- Make sure the skill level matches your experience, to avoid disappointments.
- Follow the instructions carefully. Read and understand the entire step before you perform each operation.
- Perform the assembly in the correct order as stated in this manual.
- Position all parts on the PCB (Printed Circuit Board) as shown on the drawings.
- Values on the circuit diagram are subject to changes, the values in this assembly guide are correct*.
- Use the check-boxes to mark your progress.
- Please read the included information on safety and customer service.

* Typographical inaccuracies excluded. Always look for possible last minute manual updates, indicated as 'NOTE' on a separate leaflet.

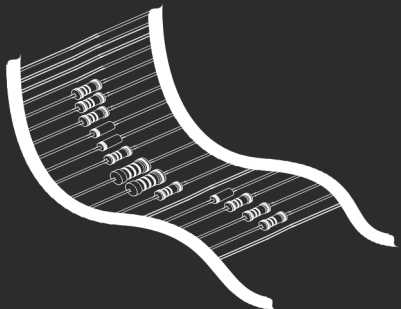
1.3 Soldering Hints :

1. Mount the component against the PCB surface and carefully solder the leads.

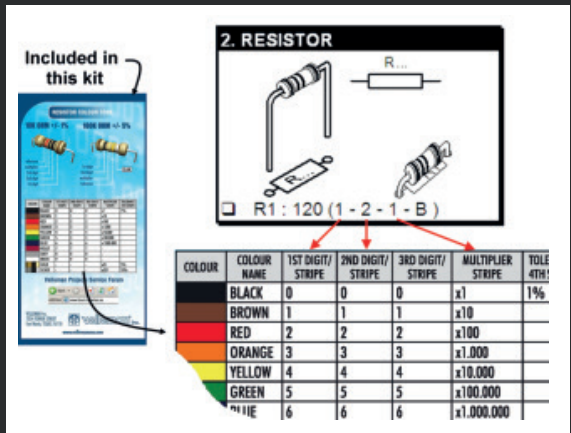


2. Make sure the solder joints are cone-shaped and shiny.

3. Trim excess leads as close as possible to the solder joint.



REMOVE THEM FROM THE TAPE ONE AT A TIME !

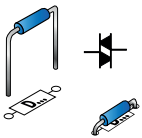


COLOUR	COLOUR NAME	1ST DIGIT/ STRIPE	2ND DIGIT/ STRIPE	3RD DIGIT/ STRIPE	MULTIPLIER STRIPE	TOLE 4TH
	BLACK	0	0	0	x1	1%
	BROWN	1	1	1	x10	
	RED	2	2	2	x100	
	ORANGE	3	3	3	x1.000	
	YELLOW	4	4	4	x10.000	
	GREEN	5	5	5	x100.000	
	BLUE	6	6	6	x1.000.000	

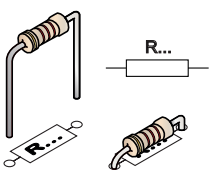
DO NOT BLINDLY FOLLOW THE ORDER OF THE
COMPONENTS ONTO THE TAPE. ALWAYS CHECK THEIR VALUE ON THE PARTS LIST!

I CONSTRUCTION

1 Diac



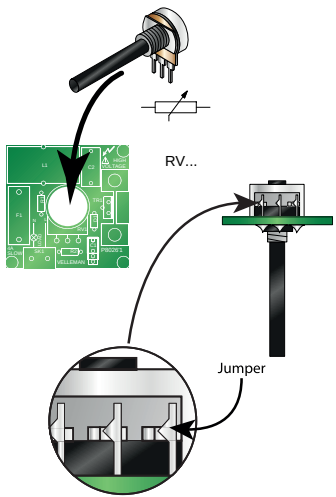
2 Resistors



❑ R1: 5K6 (5 - 6 - 2 - B)

FOR 110/125V ONLY:
❑ R2: 220K (2 - 2 - 4 -B)

3 Potentiometer

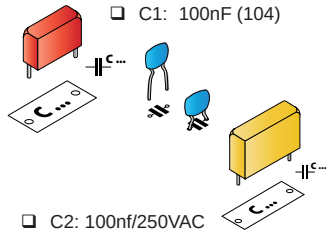


❑ RV1: 470K

Use supplied jumper wire to connect as shown.

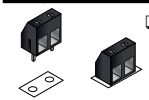
4 Ceramic capacitors

❑ C1: 100nF (104)



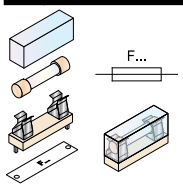
❑ C2: 100nf/250VAC

5 Terminal block



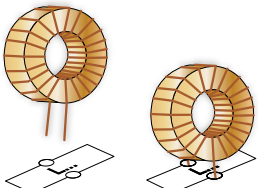
❑ SK1: 2p

6 Fuse holder + Fuse



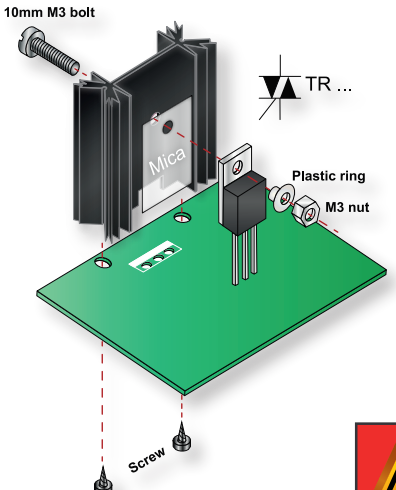
❑ F1 (4A T)

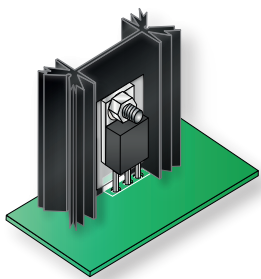
7 Coil



❑ L1: 1,5mH / 1KHz. - 4A

8 Triac

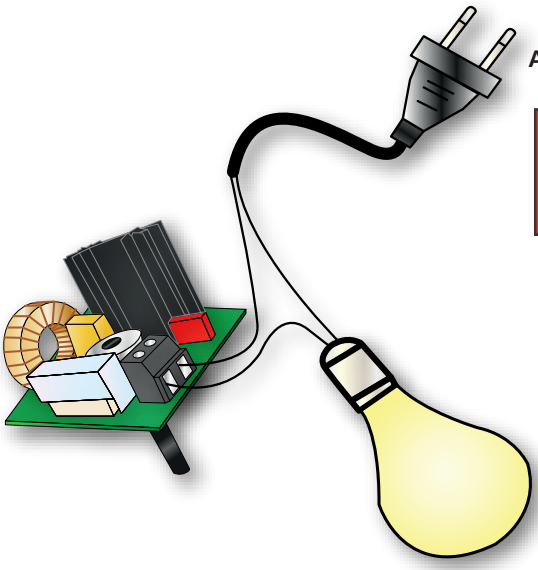




❑ TR1: TIC225M or eq.

IMPORTANT : Put an extra layer of solder on all pre-thinned PCB tracks, to improve their current handling capabilities.

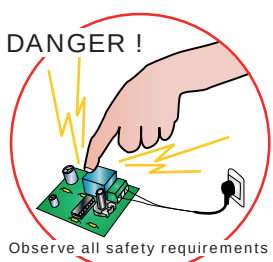
II HOOK-UP EXAMPLE



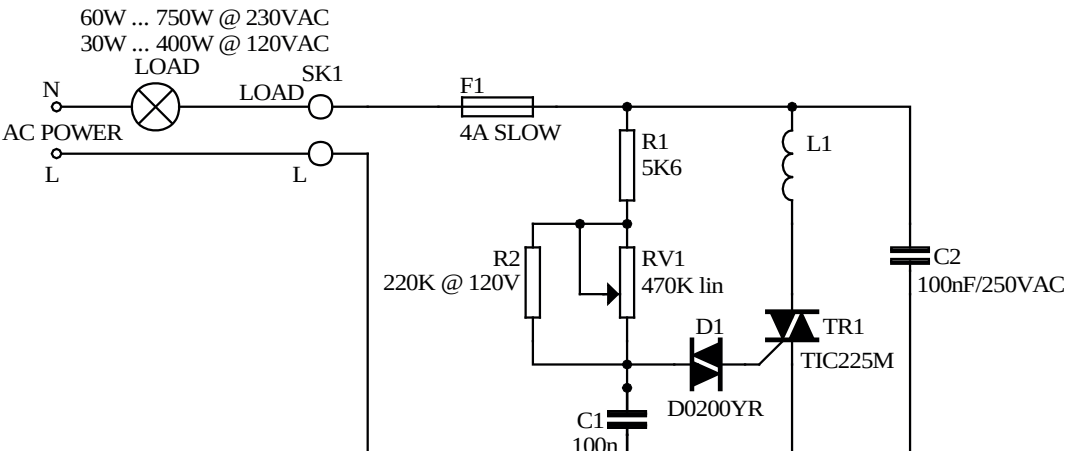
AC POWER

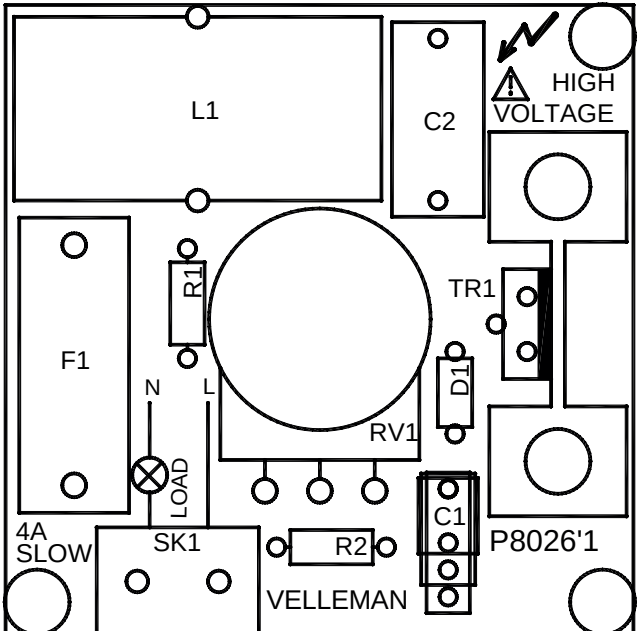
WARNING : All parts carry lethal voltages!
Do not touch while operating. Use an isolated enclosure knob.

MAXIMUM:
380W / 110V
750W / 240V

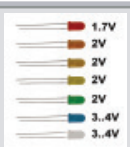


Observe all safety requirements !

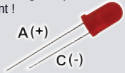

60W ... 750W @ 230VAC
30W ... 400W @ 120VAC
LOAD
N
LOAD
SK1
F1
4A SLOW
AC POWER
L
L
R1
5K6
L1
R2
220K @ 120V
RV1
470K lin
C2
100nF/250VAC
D1
TR1
TIC225M
D0200YR
C1
100n

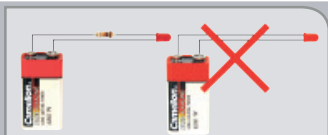

L1
C2
HIGH
VOLTAGE
F1
R1
TR1
D1
N
L
RV1
LOAD
4A
SLOW
SK1
R2
C1
P8026'1
VELLEMAN

Leds and how to use them

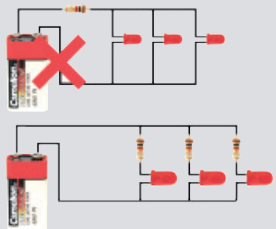


Leds feature a specific voltage drop, depending on type and colour. Check the datasheet for exact voltage drop and rated current !





Never connect leds in parallel



How to Calculate the series resistor:

Example: operate a red led (1.7V) on a 9Vdc source.
Required led current for full brightness: 5mA (this can be found in the datasheet of the led)

$$\frac{\text{Supply voltage (V) - led voltage (V)}}{\text{required current (A)}} = \text{series resistance (ohms)}$$

$$\frac{9V - 1.7V}{0.005A} = 1460 \text{ ohm}$$

closest value : use a 1k5 resistor

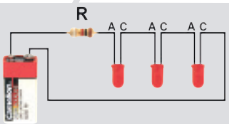
Required resistor power handling=
voltage over resistor x current passed trough resistor

(9V - 1.7V) x 0.005A = 0.036W

a standard 1/4W resistor will do the job

LEDs in series:

Example: 3 x red led (1.7V) on 9V battery
Required led current for full brightness: 5mA
(this can be found in the datasheet of the led)



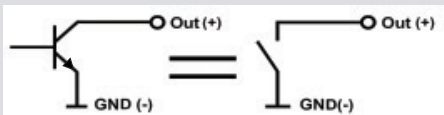
$$\frac{\text{Supply voltage (V) - (number of leds x led voltage (V))}}{\text{required current (A)}} = \text{series resistance (ohms)}$$

$$\frac{9V - (3 \times 1.7V)}{0.005A} = 780 \text{ ohm}$$

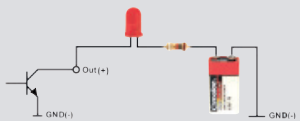
use an 820 ohm resistor

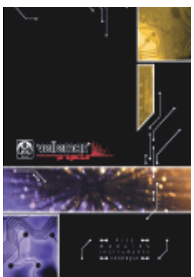
open collector outputs

An open collector output can be compared to a switch which switches to ground when operated



Example: How to switch an LED by means of an open collector output





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