

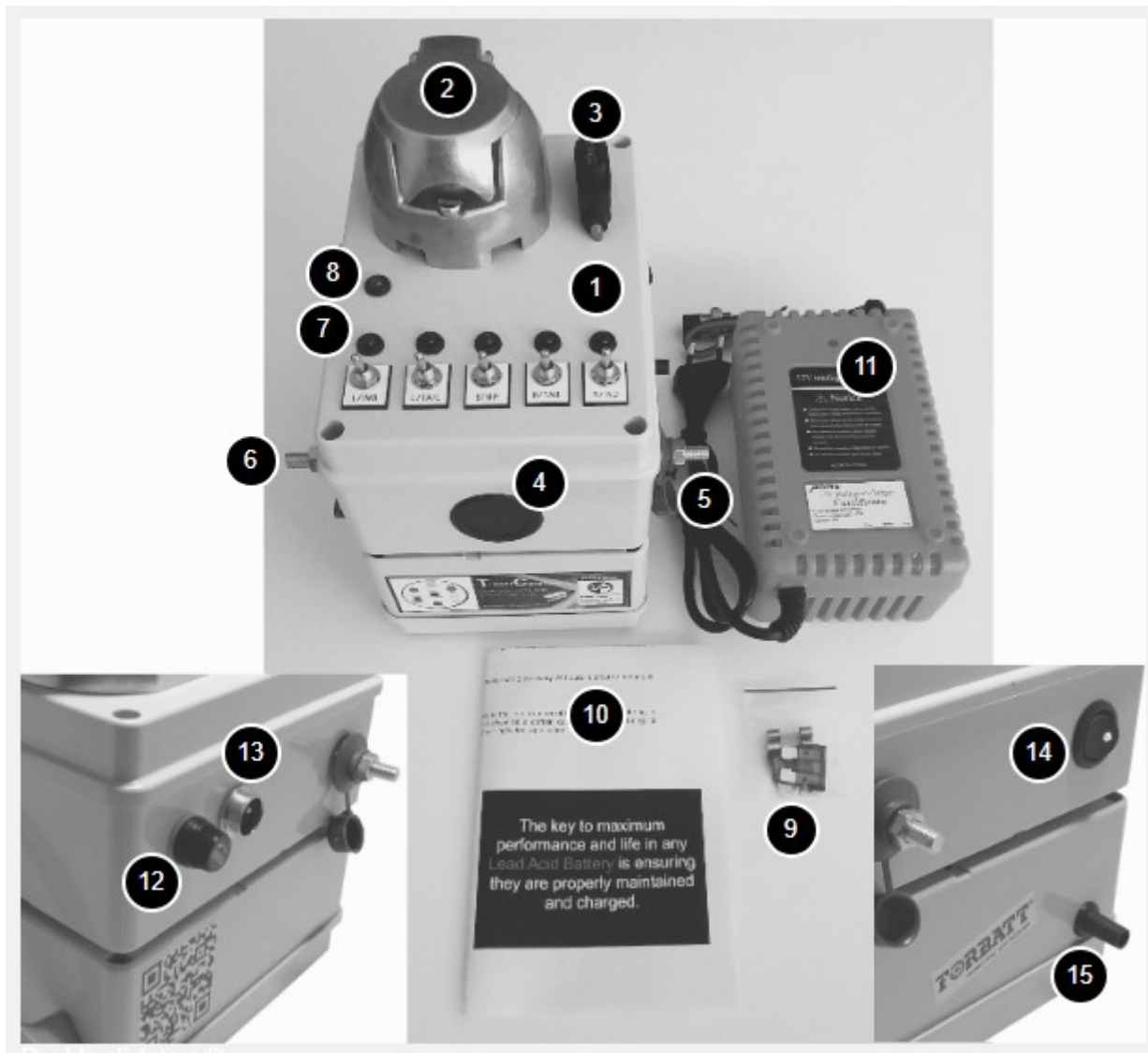


Phone: +27 63 378 9745
Email: ajpmobilebox@gmail.com
Website: <https://petertuneup.co.za/trailertester.html>

USER GUIDE

Mini Toggle (ECON) Trailer Light Tester
MODEL: MT2025

Thank you for purchasing this product. Before use, please print and read this user guide carefully, and keep it safe for future reference.



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HOW TO SAFELY OPERATE TESTER

The Mini Toggle (ECON) trailer light tester is portable for use, whether you are at your workshop or on-site, just keep the battery charged.

Use the main switch (rocker switch on the side of tester) to power on/off the tester. When switching the rocker switch on, the twelve-volt battery of tester and its testing circuit is then switched on and will supply power. Remember to insert all fuses before switching on the tester.

The tester battery can be re-charged when voltage goes below 11.40 volts and is in a fully charged state when the voltage is above 12.80 volts. The voltmeter of the tester can monitor the voltage. For tester protection, we recommend 7.5-ampere fuses.

Tester fuse will burn through when overloading or a short occurs. Overloading happens when current races near the rated current of fuse in a very short time until the fuse overheats and burns through. Switching on all light circuits of tester will induce overloading. A short happens when opposite polarities come into contact with each other. The voltmeter reading on the tester will drop rapidly just before the fuse blows when in a short state.



When there is a short somewhere, switch off tester and find the origin of the short and fix it, then continue testing.

Indicators on the tester:

Front side of tester	Voltmeter	Indicates tester is powered on and ready. It also shows the voltage reading of the battery connected to the tester.
Testing LED's	Single colour high bright	Indicates toggle activity.
Left side of tester	Bi-colour (red/green)	Indicates if there is a positive or negative source connected to the auxiliary wire. Read more on auxiliary test.

CAUTION:

- The tester can handle a maximum load of 30 amperes. Do not insert fuses rated more than 10 amperes, as the tester electrical components may get damaged
- Tester not waterproof; keep away from water, oil, petrol and other liquids



Operating instructions for charger:

1. Plug the charger into a standard household AC outlet. The charging starts, and the indicator will light up GREEN.
2. The indicator will go RED if the battery needs charging.
3. When the battery is full, the charger will switch to trickle charge automatically. The charging indicator will go back to GREEN.
4. When you finish re-charging, unplug the unit from the AC outlet. Then disconnect the charger plug/jack from the tester.
5. NEVER DISCONNECT THE BATTERY CONNECTOR BY PULLING ON THE WIRES.
6. The charger will automatically reset when unplugging it from the AC outlet or disconnecting the battery from the charger. Charging will repeat immediately following the above steps.
7. Charging circuit protection (fuse holder) is located next to the charging jack on the front side of the tester. **Do not insert fuses rated more than ten ampere**



CAUTION:

This charger can only charge 12V 1-70AH lead-acid batteries. Charging other types of batteries may cause personal injury and damage to the charger.



Do not use tester while the battery is charging

TESTING TOW SOCKET, WIRING CIRCUIT AND LIGHTS OF TRAILER OR CARAVAN

Quick Tip

Please clean and remove dirt from the trailer or caravan tow plug before plugging into the tester. When plugged in, it sometimes helps wiggle the plug to loosen sticky terminals, ensuring better contact.

- Insert the trailer or caravan tow plug into the tow socket of tester. The tester will supply permanent negative polarity to the trailer or caravan that you are testing.
- After inserting the plug, power on tester and start testing

- EARTH / GROUND WIRE TEST -

On trailers and caravans fitted with standard light globes:

With no earth/ground wire connected on the trailer or caravan - On the tester, switching on any of the toggle switches will let the LED's (except the auxiliary LED) light up. The lights on the trailer or caravan will not work or light up very dimly if there is a poor connection. Fix the earth/ground circuit before continuing.

With the earth/ground wire swapped between light circuits on trailer or caravan - On the tester, switching on any of the toggle switches will light up two or more LED's, indicating an earth/ground fault. The lights on the trailer or caravan will also work incorrectly. Fix the earth/ground circuit before continuing.

With the earth/ground wire of the trailer or caravan connected to the auxiliary circuit - On the tester, without switching on any of the toggle switches, the auxiliary LED will light up dimly green with the other LED's lighting up brightly. The lights on the trailer or caravan will not work when switching on the toggle switches. Fix the earth/ground circuit before continuing.

On trailers and caravans fitted with LED lights:

With no earth/ground wire connected on the trailer or caravan - On the tester, switching on any of the toggle switches will make none of the LED's light up, and no lights will work on trailer or caravan. Fix the earth/ground circuit before continuing.

With the earth/ground wire swapped between light circuits on trailer or caravan - On the tester, switching on any of the toggle switches, two or more LED's will light up, indicating an earth/ground fault. The lights on the trailer or caravan will not work. Fix the earth/ground circuit before continuing.

With the earth/ground wire of the trailer or caravan connected to the auxiliary circuit - On the tester, the auxiliary LED will light up red when switching on any of the toggle switches. The lights on the trailer or caravan will not work. Fix the earth/ground circuit before continuing.

- STOP LIGHT TEST -

- Switch on the stop light toggle switch of tester
- The stop LED on tester must light up, and both left and right-hand stop lights of trailer/caravan must work
- If stop lights work, then the circuit is OK
- Switch off and continue to next test

If the circuit fails the test, then check for the following faults -

- Trailer/caravan tow plug and lights not wired according to standard
- Blown globes
- Globes wrongly fitted (check all globes)
- Worn or dirty contact points
- Dead/broken positive wire (red) from trailer/caravan tow plug to stop lights
- Earth/ground wire (white) from trailer/caravan tow plug to lights is dead/broken or not making full contact at globe holder/s negative side

- R/H TAIL LIGHT TEST -

- Switch on the right-hand tail light toggle switch of tester
- The right-hand tail LED on the tester must light up, and the right-hand tail light on the trailer/caravan must light up
- If right-hand tail light and number plate light works, then the circuit is OK
- Switch off and continue to next test

If the circuit fails the test, then check for the following faults -

- Trailer/caravan tow plug and lights not wired according to standard
- Blown globes
- Globes wrongly fitted (check all globes)
- Worn or dirty contact points
- Dead/broken positive wire (brown) from trailer/caravan tow plug to tail light
- Earth/ground wire (white) from trailer/caravan tow plug to light is dead/broken or not making full contact at globe holder/s negative side

- L/H TAIL LIGHT TEST -

- Switch on the left-hand tail light toggle switch of tester
- The left-hand tail LED on the tester must light up, and the left-hand tail light on the trailer/caravan must light up
- If left-hand tail light and number plate works, then the circuit is OK
- Switch off and continue to next test

If the circuit fails the test, then check for the following faults -

- Trailer/caravan tow plug and lights not wired according to standard
- Blown globes
- Globes wrongly fitted (check all globes)
- Worn or dirty contact points
- Dead/broken positive wire (black) from trailer/caravan tow plug to tail light
- Earth/ground wire (white) from trailer/caravan tow plug to light is dead/broken or not making full contact at globe holder/s negative side

- R /H INDICATOR LIGHT TEST -

- Switch on the right-hand indicator light toggle switch of tester
- The right-hand indicator LED on the tester must light up and flash, as well as the right-hand indicator light on the trailer/caravan must light up and flash
- If the right-hand indicator works then the circuit is OK
- Switch off and continue to next test

If the circuit fails the test, then check for the following faults -

- Trailer/caravan tow plug and lights not wired according to standard
- Blown globes
- Globes wrongly fitted (check all globes)
- Worn or dirty contact points
- Dead/broken positive wire (green) from trailer/caravan tow plug to indicator light
- Earth/ground wire (white) from trailer/caravan tow plug to light is dead/broken or not making full contact at globe holder/s negative side

- L /H INDICATOR LIGHT TEST -

- Switch on the left-hand indicator light toggle switch of tester
- The left-hand indicator LED on the tester must light up and flash, as well as the left-hand indicator light on the trailer/caravan must light up and flash
- If the left-hand indicator works then the circuit is OK
- Switch off and continue to next test

If the circuit fails the test, then check for the following faults -

- Trailer/caravan tow plug and lights not wired according to standard
- Blown globes
- Globes wrongly fitted (check all globes)
- Worn or dirty contact points
- Dead/broken positive wire (yellow) from trailer/caravan tow plug to indicator light
- Earth/ground wire (white) from trailer/caravan tow plug to light is dead/broken or not making full contact at globe holder/s negative side

- AUXILIARY CONNECTION TEST -

If the auxiliary wire receives any power, the LED (auxiliary) on the tester will either go red for positive power source or green for negative power source. By standard, this wire is open with nothing connected to it, and the LED should not illuminate. If it does, check for what reason.

- SHORT CIRCUIT TEST -

Depending on the electrical cable length, size, and condition, the resistance also increases. The main testing fuse (7.5A) of the tester may not always blow immediately or at all because the electrons have to travel further through the wire. The only way to check for shorts on light circuits of the trailer or caravan is by using our trailer light testers and any ammeter. If you suspect a short or want to test for a short in a circuit, remove the tester fuse, insert the ammeter probes in the fuse slots, and start with the test.

Test 1:

In this test, we are only going to test the stop light circuit. The stop light circuit consists of two light globes connected in parallel, with power ratings of 12v/21w each. The electrical cable used is 8 meters long, seven core, with wires of a cross-sectional area of 0.75mm² each. The electrical cable wires are in excellent condition, with low resistance.

To calculate the total load, add all the light globes used in the circuit. Use this number and compare it with what the ampere-meter shows. The ampere-meter reading value must be as close as possible to the calculated load number for the circuit to pass the short circuit test.

As mentioned above, an electrical cable can have a significant adverse effect on a trailer or caravan light circuit if it's not right. Luckily, when carrying out a short circuit test, it will also determine if the electrical cable needs replacing.

Take note: Most electrical cables, five to ten percent (5-10%) volt drop, are allowed; if more than that, the resistance is too high for use. Selecting the right electrical cable size and length are important for lights to work perfectly and efficiently.

<p>Type of test Testing Circuit information Electrical cable information</p> <p>Circuit total load calculation <i>(using ohm's law)</i></p> <p>Ammeter reading value</p> <p>TEST PASSED!</p>	<p>short circuit test trailer stop light circuit 2 x standard globes 12v/21w 8 meter, seven core with wires of 0.75mm² each- Volt drop is in range with low resistance. The cable is good.</p> <p>$P = V \times I$ (P)21 = (V)12 x I I = 1.75 A x 2 (light globes) = 3.5 A</p> <p>The value which the ampere-meter must show more or less, for the circuit to pass the test.</p> <p>3.49 A (0.01 Ampere difference)</p> <p>Result: The amp-meter reading value is in range and very close to 3.5 Amperes. No short circuit was detected.</p>
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Test 2:

In this test, we are only going to test the stop light circuit. The stop light circuit consists of two light globes connected in parallel, with power ratings of 12v/21w each. The electrical cable used is 50 meters long, seven core, with wires of a cross-sectional area of 0.75mm² each. The electrical cable wires are in bad condition, with high resistance.

To calculate the total load, use the same method as Test 1.

<p>Type of test Testing Circuit information Electrical cable information</p> <p>Circuit total load calculation <i>(using ohm's law)</i></p> <p>Ammeter reading value</p> <p>TEST FAILED!</p>	<p>short circuit test trailer stop light circuit 2 x standard globes 12v/21w 50 meter, seven core with wires of 0.75mm² each- Volt drop is above 10% with high resistance. The cable is not good.</p> <p>$P = V \times I$ $(P)21 = (V)12 \times I$ $I = 1.75 \text{ A} \times 2 \text{ (light globes)}$ = 3.5 A</p> <p>The value which the ampere-meter must show more or less, for the circuit to pass the test.</p> <p>2.50 A (1.00 Ampere difference)</p> <p>Result: The amp-meter reading value is not in range, over one-ampere difference on the lower-level side. The cable is the cause of the current to drop in the circuit. No short circuit was detected.</p>
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Test 3:

In this test, we are only going to test the stop light circuit. The stop light circuit consists of two light globes connected in parallel, with power ratings of 12v/21w each. The electrical cable used is 50 meters long, seven core, with wires of a cross-sectional area of 0.75mm² each. The electrical cable wires are in bad condition, with high resistance.

To calculate the total load, use the same method as Test 1 or 2.

<p>Type of test Testing Circuit information Electrical cable information</p> <p>Circuit total load calculation <i>(using ohm's law)</i></p> <p>Ammeter reading value</p> <p>TEST FAILED!</p>	<p>short circuit test trailer stop light circuit 2 x standard globes 12v/21w 50 meter, seven core with wires of 0.75mm² each- Volt drop is above 10% with high resistance. The cable is not good.</p> <p>$P = V \times I$ $(P)21 = (V)12 \times I$ $I = 1.75 \text{ A} \times 2 \text{ (light globes)}$ = 3.5 A</p> <p>The value which the ampere-meter must show more or less, for the circuit to pass the test.</p> <p>5.30 A (1.80 Ampere difference)</p> <p>Result: The amp-meter reading value is not in range, nearly two-ampere difference in the upper-level side. A short circuit was detected.</p>
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Test 4:

In this test, we are only going to test the stop light circuit. The stop light circuit consists of two light globes connected in parallel, with power ratings of 12v/21w each. The electrical cable used is 8 meters long, seven core, with wires of a cross-sectional area of 0.75mm² each. The electrical cable wires are in excellent condition, with low resistance.

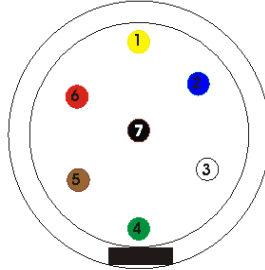
To calculate the total load, use the same method as Test 1, 2, or 3.

Type of test Testing Circuit information Electrical cable information	short circuit test trailer stop light circuit 2 x standard globes 12v/21w 8 meter, seven core with wires of 0.75mm ² each- Volt drop is in range with low resistance. The cable is good.
Circuit total load calculation <i>(using ohm's law)</i>	$P = V \times I$ $(P)21 = (V)12 \times I$ $I = 1.75 \text{ A} \times 2 \text{ (light globes)}$ $= \underline{\underline{3.5 \text{ A}}}$ The value which the ampere-meter must show more or less, for the circuit to pass the test.
Ammeter reading value TEST FAILED!	+10 A (tester fuse blew) Result: The amp-meter reading value is not in range. The fuse on the tester blew as the current increased above the rated fuse of 7.5 amperes. A short circuit was detected.

List of common short circuits on trailer or caravans:

- Faulty globes or LED's
- Poor connections on globe holder/s
- Damaged insulation on wires
- Wire connections not correctly insulated
- Burned wires inside harness
- Bad connections made inside tow plug
- Wires not wired according to SABS standard
- Incorrect cable size used

WIRING DIAGRAM TAILGATE (TRAILER)
SABS 1327 - 1981



- 1.---- LEFT INDICATOR ----YELLOW
- 2.---- AUXILIARY-----BLUE
- 3.---- EARTH-----WHITE
- 4.----RIGHT INDICATOR----GREEN
- 5.----RIGHT TAIL-LIGHT-----BROWN
- 6.----STOP LIGHTS-----RED
- 7.----LEFT TAIL-LIGHT-----BLACK

