



## 550.1690

- 🇩🇪 6 + 12V Batterietester
- 🇬🇧 6 + 12V Battery tester
- 🇫🇷 Testeur de batterie 6-12V + alternateurs



## Introduction

Dear customer!

Thank you for buying one of our products. You can find all the information you need in these operating instructions.

Please read the instructions completely with care and observe the advice given. The operating instruction is part of the item and should be kept intact. The manufacturer is not liable for personal injuries and material damages which result from improper use.

## 1. Provisions for use

With this lead battery tester, you have purchased a product constructed according to latest state of the art. The gauge is equipped with an analog display (gauge) for fast voltage changes and stable clamps for large current loads.

The construction of the lead battery tester fulfills VDE 0411= EN 61010. It has been EMV-tested and fulfills the requirements of valid European and national guidelines. The conformity was proven, the appropriate explanations and documents are defined by the manufacturer. To keep this condition and to guarantee a safe operation, you must as a user observe these operation instructions!



**Pay heed to the vehicle manufacturer's specifications!**

## 2. Technical data and measurement tolerances

Display:	Analog gauge with zero-point correction
Test current:	approx. 100 A of 5% at 13.2 V
Voltage measurement range:	approx. 0 to max. approx. 16 VDC (direct voltage)
Running voltage range:	approx. 0 to max. approx. 16 VDC
Red area 6 V/12 V:	< 4.6 V / < 7 to 9 V
Yellow area 6 V/12 V:	4.6 to 5.8 V / 9.0 to 11.2 VDC
Green area:	5.8 to 7 V / 9.4 (200 CCA*) to 12.8 (1000 CCA*) V
Operating temperature:	0° C to +55° C
Storage temperature:	-20° C to +70° C
Relative humidity:	max. 80%, non-condensing
Dimensions (L X B X H):	approx. 295 x 160 x 80 mm (without lines)

\* CCA = Cold Cranking Amps = cold starting current

## 3. Safety and usage instructions

Tools may in principle only be used for the purpose intended, under the conditions envisaged and within the limitations as to their use.

### **WARNING - RISK OF EXPLOSIVE GASES**

1. Working in the vicinity of a lead acid battery is dangerous. Batteries generate explosive gases during normal mbattery operation. For this reason, it is of utmost importance that each time before using your tester, you read these instructions carefully and follow instructions by battery maker as well.
2. To reduce risk of battery explosion, follow these instructions and those published by the battery manufacturerand manufacturer of any equipment you intend to use in the vicinity of the battery. Observe cautionary mmarkings on these items.



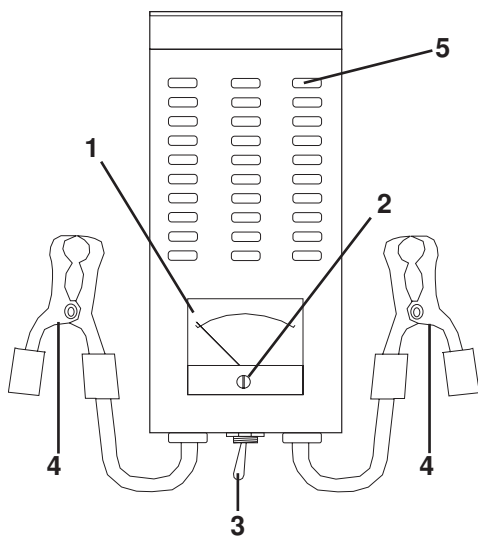
## 4. Operation

### Intended use of the lead battery tester includes:

- Determination of battery status for a 6 V or 12 V motor vehicle battery to at least 36 Ah with a running measurement (with 100 A).
- running voltage measurement (uncharged) on running engine
- battery voltage measurement (tester load switch turned off) during ignition
- charge measurements on batteries with ignition on or running engine or attached battery charger are not permitted
- measurement under adverse conditions is not permitted. Adverse conditions are:
  - strong precipitation such as rain shower or snow
  - moisture or high atmospheric humidity (e.g. fog)
  - dust and combustible gasses, vapors (gasoline, diesel or battery acid) or solvents
  - thunderstorms or storm conditions like strong electrostatic fields etc.

Another use than described above is not permitted and leads to the damage of this product. Beyond that there is a risk of hazards, e.g. short-circuit, fire, electrical shock etc. The entire product may not be changed and/or converted! The safety instructions are to be strictly observed!

### Description of adjustable components



1. Analog display with different colored indicating ranges 6 V/12 V
2. Zero-point correction (indicator zero position)
3. Toggle switch with automatic delay for measurement
4. Red terminal clamps for positive terminal (+) and black for negative terminal (-) of the battery
5. Cooling slots for shunt

**Caution:** Observe maximum input values.

### Safety instructions

We cannot accept any liability for damage to property or physical injury caused by improper use or failure to observe the safety instructions. The warranty will become void in such cases.

- This device is constructed and tested to fulfill DIN 57 411/ Type 1/VDE 0411 Type 1 protection guidelines for electronic gauges, IEC 1010-1 respectively, and has left the factory in technically flawless condition. To maintain this condition and guarantee a safe operation, the user must observe the safety instructions and warnings contained in these operation instructions.
- Gauges and devices do not belong in children's hands
- Regulations for accident prevention in commercial facilities to the of the association of the commercial professional co-operative societies for electrical systems and devices should be observed.
- In schools, educational facilities, hobby shops and workshops, trained staff are responsible to supervise the use of measurement instruments



The following safety rules must be observed when working on motor vehicle or measuring battery voltage under load:

- a) A carbon dioxide fire extinguisher must be easily and permanently available.
  - b) Steel wool, grease rags, solvents, gasoline, or fuels may only be stored in designated places and containers. Make sure to observe the rules for fire protection.
  - c) When working in the engine compartment, wear safety glasses and protective gloves to protect your eyes and hands from battery acid, gasoline, dust, airborne particles and loose machine parts
  - d) Never look into the exhaust pipes of carburetor when the engine is running, since flames can be expected from backfires, misfires, flames it is a flame at a setback, wrong misaligned or defective valves from the exhaust pipes.
  - e) When the motor is running, never touch rotating parts such as the ventilator, drive-belts, disc-belts, etc. If you have long hair, wear a hairnet. Do not work with loose clothing and/or neckties if the motor is running.
  - f) No load measurements (toggle switch switched off) with a running engine!
  - g) Do not wear any jewelry such as necklaces, rings (also earrings), or watches etc. carbon monoxide gas (co. gas) leaving perhaps (at the burning arising)
  - h) Ensure sufficient ventilation (garage or workshop) is unconditional worries for you extremely poisonously).
  - i) Avoid contact with the exhaust and cooling systems. Risk of burning! Never open the radiator cap of a running or hot engine.
  - k) Make sure that your vehicle is braked (engaged parking brake), no gear is engaged, and that the vehicle is in „park“ with vehicles having automatic transmissions.
  - l) Do not smoke when making measurements or working on the motor vehicle battery! Solvent vapors and hydrogen gas at the charging of lead acid batteries are extremely explosive gasoline-;!
  - m) Do not leave any tools lying on the battery. Also do not place the gauge on the battery under any circumstances. Short-circuit hazard! Avoid contact with battery acid. The corrosive acid can seriously damage your clothing and „corrode“ your skin or eyes. When measuring an external/deconstructed battery, the gauge must be held at a distance of at least 0.5 m (= 50 cm) above the ground.
- If it is ascertained that safe operation is no longer possible, then the device should be taken out of operation and secured against accidental operation. Pull out power supply plugs from the plug socket, cigarette lighter line mark! It is ascertained that safe operation is no longer possible, if: the device shows visible damage the device does not work any longer after longer storage under unfavourable conditions, or after heavy transport stresses Never switch the device on right away if it was taken in from a cold area to a warm area. The condensation developing as a result can sometimes destroy the device. Let the switched-off device come to room temperature. Wait for the condensation to evaporate.

### Use of the lead battery tester

**Caution:** Never operate the lead battery tester in the open air. Always use only the measurement cables attached tightly for your measurements. Pay attention to the undamaged isolation of the cables and the terminal clamps before every putting into operation.

#### Operation

The display probes of the gauge contact clamps out to the right after the polarity connection to the positive terminal (+) and the negative terminal (-) of the battery to be checked and at sufficient capacity. The displayed voltage value shows the (uncharged) no-load voltage of the battery. With the toggle switch the burden is turned off, the battery is charged to 100 A. The battery voltage is displayed under burden now. The switch must remain on for approx. 10 s during the measurement.

### Measurement procedure

#### A Battery charge test

With this test, it can be determined whether the battery has sufficient capacity to start the engine reliably, also under unfavorable climatic conditions. The battery will be charged with approx. 100 A during this measurement. If the battery voltage remains relatively constant at > 12 V during the measurement period (approx. 10 s), then the battery is functioning correctly. If the voltage falls in this short period, then the battery is either uncharged or defective.

- Start the engine, turn off all power loads (excluding the clock and clock memory), and remove the ignition key
- Attach the red clamp (+) to the positive terminal (+) of the battery and the black, isolated clamp to the negative terminal (-) of the battery. Gently shake the clamps at the terminal to ensure contact.



- An „no-load voltage” is displayed in the polarity connection. The battery voltage of approx. 12.4 V is required before performing a charge test. After performed charge the no-load voltage is for this one. The battery less than approx. 12.4 VDC, so is still already damaged battery. Nothing happens. If there is no display, probably one of the clamps is loose or does not have any contact.
- Move the toggle switch to the right for for approx. 10 s to start the charge test.
- Refer to the following table. Here is listed the minimum voltage for the battery:

#### Display Battery status

- 1. Green area (6 or 12 V):** The battery has a sufficient capacity
- 2. Yellow area:** The battery is insufficiently charged. This battery is either empty or defective. If it is a conventional maintenance-free battery, determine the acid density for battery with an acid pipette, (for at least 1.20 to 1.22 kg/l). The value remains under approx. 1.24 kg/l after charging. The battery is used up (after approx. 5 to 8 years) and must be replaced. With a maintenance-free battery, the charge remains without a test for acid density.
- 3. Red area:** The battery is possibly defective or seriously uncharged and should be replaced.

**Caution:** During the test, the upper unit cover of the tester gets very hot (with the cooling slots). Let the tester cool down for at least a minute before you perform a further test. Never perform more than 3 test within 5 minutes.

#### B Charging voltage measurement (headlight test)

The charging system of the motor vehicle is tested with this measurement. A sustained under or overcharging of the motor vehicle battery will inevitably lead to damage. The charge test should be performed (described above) before this test. If the battery is OK, you can continue the measurement.

**Caution:** The engine should be at operating temperature.

Proceed as follows:

- Attach the red clamp (+) to the positive terminal (+) of the battery and the black, isolated clamp to the negative terminal (-) of the battery. Gently shake the clamps at the terminal to ensure contact.
- switch off all power loads (lights, fans, discs, boosters, etc.), start the engine and hold at a slowly increasing idle speed of approx. 1500 RPM.
- never press the toggle switch during this measurement
- read the voltage value on the analog display
- now turn on the high-beam headlights and set your fans to the highest level. The voltage display should change no more than around approx. 0.1 to 0.3 volts (V).

If the display remains relatively stable, the charging system of your motor vehicle is OK. If the voltage changes to more than approx. 0.3 V (above or below), you have your charging electrical equipment (headlights, regulators, brushes, drive-belts, cables, points, cables, plug connector etc.) examined by a mechanic.

#### C Starter test

With this test, it can be determined relatively easily whether your vehicle starter does not take enough current from the battery. Currents of more than approx. 200 Amp can be produced. Make absolutely sure that the battery is correct before this test. If the battery is weak or defective, then this test is not useful. Proceed as follows:

- Attach the clamps polarity with the insulated terminals of the battery and gently shake the clamps for a secure contact (upper oxidation „scratched-off“).
- Refer to the following table. Here is listed the minimum voltage for the battery, during the starting process with starter (lower part = Cranking) and without starter (upper part). This value is relatively dependent on vehicle type, engine size, etc. being used. The table entries apply for vehicles with a engine size of 3600 cc or greater. For engines with less than 3600 cc, use the next highest voltage value.



- Start the machine (engine) and read the voltage value during the starting process. Compare the value with the following table. If the value is substantially lower than the „cranking” voltage, either the starter is defective or there is a bad cable connection (transmission resistance) or the battery is too small (under-sized) for the motor vehicle.

RUNNING VOLTAGE (IN V)	10,2	10,4	10,6	10,8	11,0	11,2	11,4
MINIMUM STARTING VOLTAGE (IN V)	7,7	8,2	8,7	9,2	9,7	10,2	10,6

**Example:** The running voltage without starter is 11.0 V. When starting, the voltage drops to approx. 9.7 V. The engine size is 3600 cc or more. If the engine size is under 3600, the voltage may drop to no less than 10.2 V\* (less starting current / performance).

Additional information about lead batteries!

- The starting power (capacity) of a fully-charged battery drops to under 70% at minus temperatures.
- Most damage to lead batteries comes from overcharging.
- „Warm“ batteries are fully-charged at a faster rate than cold batteries.
- every battery loses it's charge. The discharge current is lowest with maintenance-free batteries.
- a battery that has remained uncharged over a long time period, will sulphurize very easily (sulfur deposits on the plates) and will lose capacity as a result.
- a charged fault-free battery has a no-load voltage of 12.7 V or more. A defective or uncharged battery has a no-load voltage of 10.5 V or less.

## 5. Maintenance

Incorrect or defective replacement parts can lead to damage.

The lead battery tester is maintenance-free except for occasional cleaning of the clamps and unit cover. It may not be opened under any circumstances. If the lead battery tester is nevertheless opened or modified, the warranty claim expires. Use a clean, lint-free, staticfree and dry cleaning cloth for cleaning the device.

**Caution:** Do not use any carbon-containing cleaning agent, gasoline, alcohols or similar for cleaning. This will affect the casing of the gauge. In addition, the fumes are noxious and explosive. Also do not use anysharp tools, screwdrivers, metal brushes or similar for cleaning.

## 6. Checks

All tools are to be checked for damage.

## 7. Disposal

Dispose the unusable, irreparable lead battery tester in accordance with valid laws.



## 8. Guarantee

The KS Tools Werkzeuge-Maschinen GmbH guarantee applies for all tools that are used under normal usage conditions.

The following are excluded from the guarantee:

- **Consumables** e.g. any type of cutting tools, cutting inserts and disks, cutting and scraping tools, brooms, brushes, files, batteries, bits or bit sockets, rotor blades in pneumatic devices, isolators on heating coils, any type of fuses, carbon brushes, etc.
- **Faulty functioning** of parts that show usage-related or other natural wear and tear, as well as tool defects that can be traced back to usage-related or other natural wear and tear.
- **Defects** in the tool that can be traced back to a failure to observe the operating instructions, improper use, use under abnormal environmental conditions or unsuitable operating conditions, overloading or improper maintenance. Also defects in tools caused by the use of accessory parts or other parts that are not KS Tools original parts.
- Tools which have been modified or equipped with additions.
- Minor deviations from the intended quality that are however insignificant for the value and suitability for use of the tool.

The guarantee period is 12 months in cases of industrial or equal use.

The guarantee period starts on the date of purchase by the commercial end customer. The date of the original purchase receipt is decisive. For technical products with limited guarantee types A, B and C, the user must principally submit the purchase receipt in addition to the serial number of the device, if present.

The guarantee applies under consideration of the guarantee type for the duration specified in the price list valid on the day the product was purchased.

If no guarantee claim exists for the product (expiration of the guarantee time, guarantee exclusion for the reasons listed in Sec. 2) but the repair is still possible, this will only be carried out following approval of the cost estimate by the user.