



# USER MANUAL

*Batterytester, January 2018*



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# batterytester

## General information

Congratulations with the purchase of Batterytester. The Batterytester is specifically developed for testing e-Bike batteries and other rechargeable batteries between 6V – 48V. Already in the development stage of Batterytester we stressed the fact that the testing of an e-bike battery should be as user-friendly as possible. A thorough knowledge of e-bike battery technology is not necessary however we advise everyone who is involved with e-bike batteries to invest into a course or study about battery technology. This manual gives all information needed to test e-bike batteries in a reliable manner. We advise everyone for a proper use of Batterytester to read this manual completely. In case of not following the stipulations in this manual we exclude all forms of liability.

Testing of e-bike batteries has many advantages for you. The only way to measure the capacity of an e-bike battery is by discharging this under resistance. E-bike manufacturers deliver software by which the BMS can be read-out. Please be aware that this does not give any true value about the e-bike battery's capacity. On our website: [www.batterytester.nl](http://www.batterytester.nl) you will find more information and you can follow the developments of Batterytester. You can also follow us on LinkedIn

(<https://www.linkedin.com/company/batterytester-e-powered-by-flamec-bv/>)

and Facebook ([https://www.facebook.com/accutester/?ref=aymt\\_homepage\\_panel](https://www.facebook.com/accutester/?ref=aymt_homepage_panel)).

## Which batteries I can test with Batterytester?

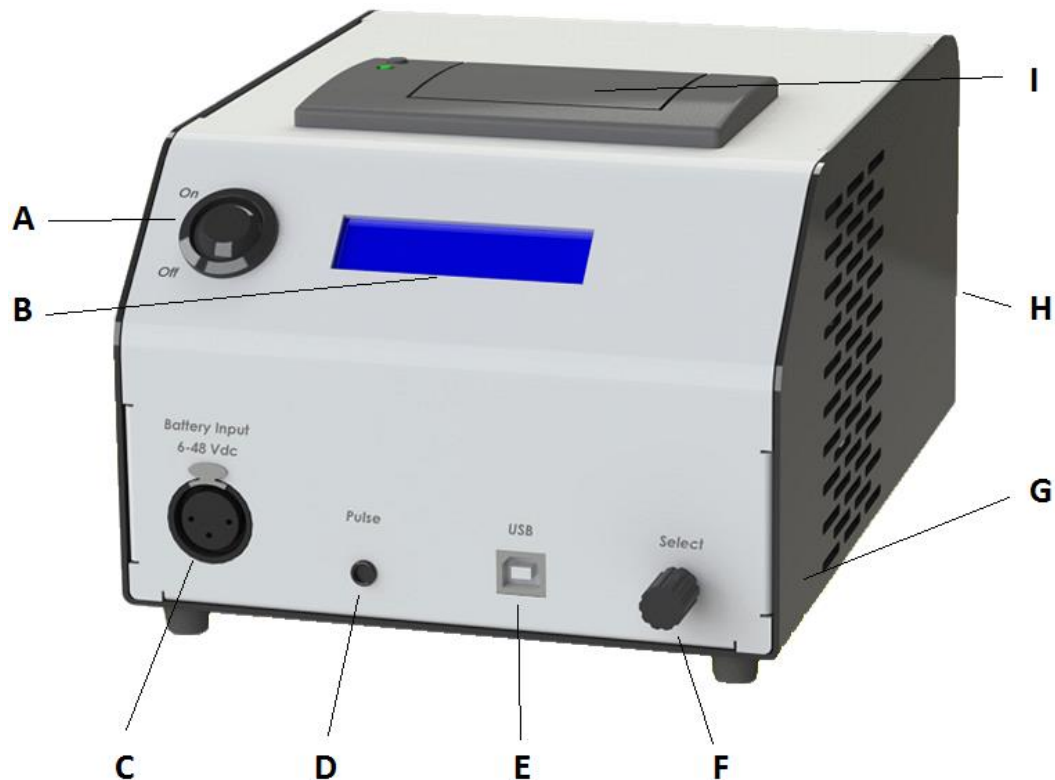
Batterytester can test all rechargeable batteries in a range of 6 – 48V (min3V – max 60V). The following types of batteries can be tested with Batterytester:

- Lead
- NiCd
- NIMH
- Lithium Ion

When your battery is not mentioned in the above list or you doubt about the type of battery you want to test please send an email to: [info@batterytester.nl](mailto:info@batterytester.nl). Please indicate the type of battery, description and some pictures. After we received your email we will check if it is possible to test your batteries with Batterytester.

All above mentioned batteries can be tested with Batterytester. Besides the types of batteries there are also different brands of batteries. Depending on the type of battery a certain cable or adapter might be needed in order to be able to test the battery concerned.

## Device description:



- A. On / Off switch
- B. Display
- C. Connector input test cable
- D. Pulse output (connection for future battery systems)
- E. USB port for connection PC / Laptop
- F. Select button (press-turn switch) and printing battery test result
- G. Input for power supply (12 Vdc)
- H. Cooling fan
- I. Integrated thermal printer

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## Check content packaging:

Open the box and check if the following items are present without any damages:



1. User Manual



2. Batterytester



3. Power supply 12Vdc



4. Universal test cable



5. USB cable



6. Adapter cable



7. Software



8. Thermal printing paper

1. User manual
2. Batterytester
3. Power supply 12 Vdc
4. Universal test cable with crocodile clips
5. USB interface cable
6. Adapter cable (adapters to be ordered separately)
7. Software Batterytester
8. Thermal printing paper, 2 rolls

## User instructions:

Batterytester can be used as stand-alone unit and also be connected to a PC / Laptop. The differences will be explained below.

For both versions of testing e-bike batteries applies the following:

The basic rule for a reliable battery capacity test is to discharge the battery with approximately the same load as for which it is designed. We recommend to always take the half of the Ah listed on the battery. If a battery has a nominal value of 10Ah, the discharge current should be set at 5A. This automatically means that the battery test will take approx. 2 hours ( $10\text{Ah}/5\text{A}=2$ ).

When you choose a higher discharge current as the nominal Ah stated on the battery this means:

- Risk of damage of the battery because of risk of battery damage;
- A prematurely abandoned test due to the thermal safety (safety provision in the battery because of the battery management system (BMS));
- Unreliable test results because of thermal losses.

Batterytester has developed an automatic programme in which e-bike batteries will be discharged with a set 5A load. However this load is changed every minute by half. The only way to test battery capacity is by having a changing load. Even if you do not make use of the automatic programme the load is halved every minute. E.g. if you decided to discharge the battery with 7A, Batterytester will every minute decrease to 3.5A shortly and after go up to 7A again.

## Using Batterytester without connection to a PC / Laptop)

When using Batterytester without a connection to a PC / Laptop you can print the test result from the integrated thermal printer on a cashier paper. Please be aware that the readability will deteriorate over time. Using Batterytester without a PC / Laptop is often done for internal purposes. The test result is stated in Wh (Watt per hour).

Steps for a battery test without connection to a PC / Laptop:

1. Please take care that Batterytester is switched off;
2. Please take care that the ventilation output is not covered. Place Batterytester in a spacious area and only use Batterytester indoors;
3. Connect the 12 Vdc Power Supply. First in the Batterytester;
4. Connect the **fully charged** battery. WARNING, check the polarity;
5. Turn Batterytester ON;
6. Press shortly the 'Select' button for the automatic testing procedure (the battery will be discharged with 5A and the current where Batterytester will stop (Ustop) the test is set as follows:  $U_{\text{open}} (\text{opening current}) * 0.72 = U_{\text{stop}}$ . The Ustop is set in order to prevent deep charging the battery;
7. Hold the 'Select' button for a longer time if you want to manually change these settings (select discharge current (I) by turning the 'Select' button and press the 'Select' button by fixing the discharge current. This also applies for the Ustop. When changing the Ustop one has to know what one is doing. In case the battery is discharged with a too heavy load the battery will be heated and the test will be stopped prematurely;

# batterytester

8. Batterytester is now discharging the battery. The discharge session will take several time depending on the battery capacity and the set discharge current.
9. If needed, press the 'Select' button for a pause, change the discharge current or stop the test if needed (turn, press to confirm);
10. When the test has finished "test ready", one can print the result by pressing once again the 'Select' button. By pressing multiple times this button multiple test results will be printed;
11. Compare the test result with the battery specifications. On the cashier paper at the bottom line is stated the capacity in Wh. If the battery stated it has a nominal capacity of 540 Wh and from the test it appears is still has 500 Wh capacity left the percentage is  $(500/540)*100=92.6\%$ ;
12. After the test you need to charge the battery again in order to prevent capacity loss and deep charge.

## Using Batterytester with connection to a laptop / PC)

By connection Batterytester with a USB cable to a PC / Laptop the user has the following advantages:

1. In the Batterytester Software Programme the user can fill out the nominal data (Voltage, Amperage, Watt per hour). At the end of the test the nominal data is being compared to the tested data and this automatically results in a capacity percentage present;
2. The user can also fill out a description of the test. E.g. the customer name, addressed can be filled out;
3. At the end of the test a PDF test report can be printed. This test report also demonstrates different graphs;
4. Batterytester saves the test report as well as a '.csv' file. In this file you can find all measured data per measurement item in a Excel File. This gives you the opportunity to create your own reports.

Testing an e-bike battery with Batterytester when connected to a PC /Laptop is often done if the test result is shown to a third party (customer / supplier).

## Steps for testing an e-bike battery when Batterytester is connected to a PC / Laptop:

1. Please take care that Batterytester is switched off;
2. Please take care that the ventilation output is not covered. Place Batterytester in a spacious area and only use Batterytester indoors;
3. Connect the 12 Vdc Power Supply. First in the Batterytester;
4. Connect the **fully charged** battery. WARNING, check the polarity;
5. Connect the USB cable to the Batterytester and the PC / Laptop. Start the Batterytester Software Programme on your PC / Laptop. Select the 'COM' port, fill out a file name, fill out the nominal data of your battery (V, Ah, Wh), press 'connect', fill out the data of your customer, press 'connect';
6. Turn Batterytester ON;
7. Press shortly the 'Select' button for the automatic testing procedure (the battery will be discharged with 5A and the current where Batterytester will stop (Ustop) the test is set as follows:  $U_{open} (\text{opening current}) * 0.72 = U_{stop}$ . The Ustop is set in order to prevent deep charging the battery;
8. Hold the 'Select' button for a longer time if you want to manually change these settings (select discharge current (I) by turning the 'Select' button and press the 'Select' button by fixing the discharge current. This also applies for the Ustop. When changing the Ustop one has to know

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what one is doing. In case the battery is discharged with a too heavy load the battery will be heated and the test will be stopped prematurely;

9. Batterytester is now discharging the battery. The discharge session will take several time depending on the battery capacity and the set discharge current.
10. If needed, press the 'Select' button for a pause, change the discharge current or stop the test if needed (turn, press to confirm);
11. After testing "test ready" you can print the test result both from the Batterytester itself (Select button) and also via the Batterytester Software Programme. If you select a PDF printer you can save the test report on your PC / Laptop;
12. After the test you need to charge the battery again in order to prevent capacity loss and deep charge.

## How do I judge the test result?

To judge the battery test result depends for which the tested battery is used. In general the common value is that batteries with a capacity < 70% are economically depreciated. As there is many difference between the different types of batteries / battery brands you need to consult your battery supplier about the expectations of the batteries' capacity over the years. In case you use Batterytester for a customer who wants to exchange his or her e-bike for a new one you can offer a well-funded price for the exchange bike.

Besides the fact that Batterytester is a service tool you can also use Batterytester as a sales tool. Based on the battery test report you can possibly convince your customer to purchase a new e-bike battery. Of course you can also ask for a testing fee for a battery test.

## Quick test, capacity test in which the driving behaviour is simulated

In order to determine the battery capacity, the battery needs to be discharged with a varying load. This is the only right way to determine the available capacity. In order to determine this a full capacity test needs to be executed. This is not possible with a so-called 'quick test'. However it is possible to determine via a 'quick test' if the battery is in a bad condition. This is the case when the resistance (Ohm) shows a too high figure. Batterytester has opted not to implement a separate programme for a 'quick test'. From the standard test programme the internal resistance is indicated on both the display and when connected to a PC /Laptop in the Software Programme. This requires some knowledge about battery technology. We recommend however to execute a full battery capacity test.

## Software & Firmware

With a Batterytester, the Batterytester Software Programme is included. This Software Programme also takes care of automatic firmware updates. To be clear: The firmware is the 'software' present in the Batterytester itself. When we speak about the Batterytester Software Programme we mean the programme you install on your PC / Laptop (Windows only).

When we have essential improvements in the operation of our Batterytester these will be implemented in firmware updates. An example of a firmware update is e.g. if the test cable between Batterytester and the battery gets disconnected (for whatever reason) in the past one had to restart the battery test all over again. With the firmware update one is able to turn the 'Select' button and select the 'continue test' option.



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## Download link Batterytester Software Programma (PC)

The Batterytester Software Programma works on all PC's with Windows (no Mac).

The actual version of the Batterytester Software Programme can be found here:

<http://batterytester.nl/ftp/install/nl/publish.htm>

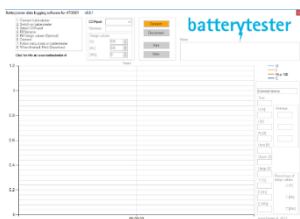
Please make sure that before installing you delete the old Batterytester Software Programme completely from your PC / Laptop.

## Firmware upgrade

Please take care you have the latest version of the Batterytester Software Programme installed on your PC (see above).

Follow these steps:

1. Batterytester should be turned OFF. Connect Batterytester and the PC with the USB cable;
2. Start the Batterytester Software Programme;



3. Choose the COM port (the COM port is the USB connection on your PC / Laptop to which Batterytester is connected);

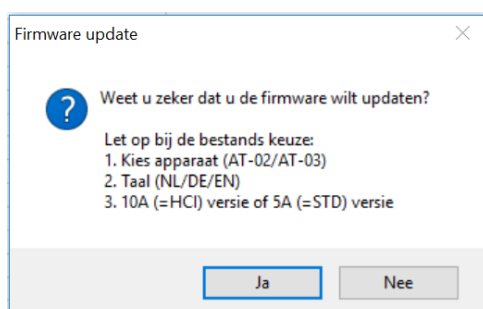
COM-port

Filenaam

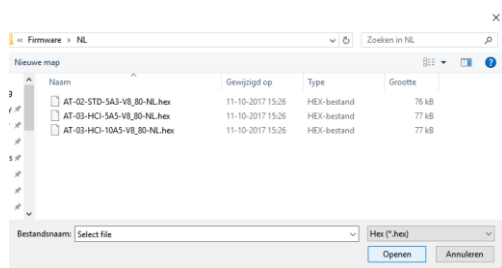
4. Klik op het logo;



5. Klik op "Yes";

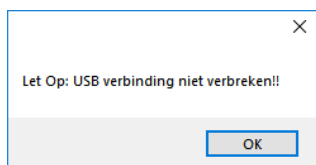


## 6. Select the file

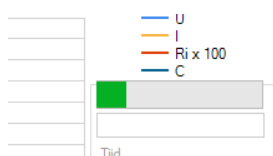


”AT-03-HCI-10A5-V8\_80-EN.hex”

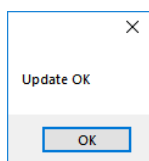
## 7. Klik op “OK”



## 8. The update is now being executed. Pay attention! Do not disconnect the USB cable



## 9. After a successful installation appears “update OK”. Klik “OK”.



**Note:** You can check the version number of your Batterytester by connecting the Batterytester to your PC / Laptop, fill out a file name and click ‘connect’. Behind FW you will find your installed firmware version.



## Warnings:

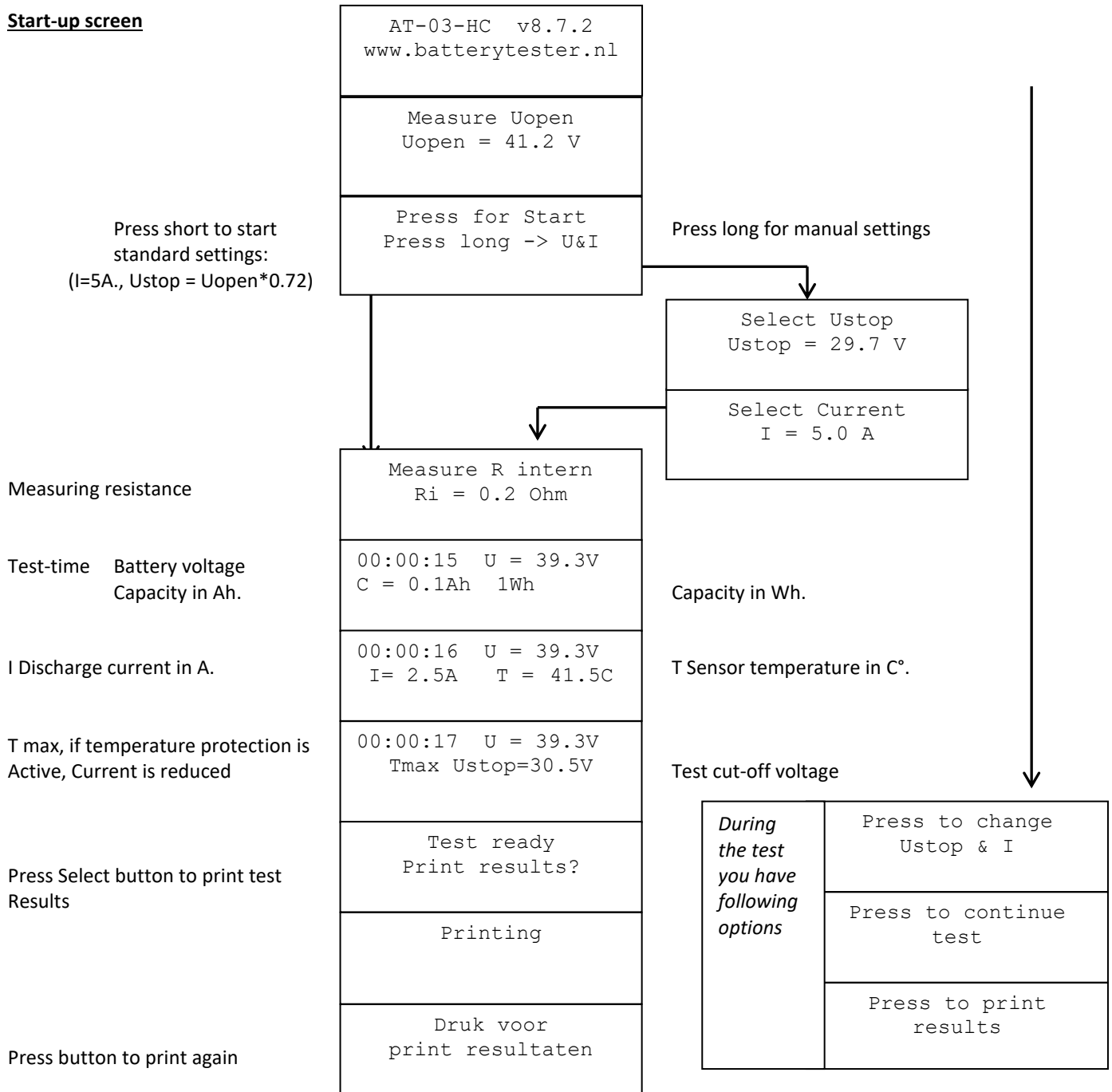
1. The Batterytester gets warm during a discharge session. Never cover the ventilation output!;
2. Short-circuit of the battery, cable parts and/or connectors is not allowed;
3. Do not connect more than one battery per discharge session
4. The discharge current always needs to be lower than the battery's capacity (example 4Ah battery -> discharge 4A);
5. Inspect the battery specifications before changing the discharge current;
6. Batteries can be damaged irreparably because of over discharging by using too much current;
7. Never experiment with the Ustop unless you are familiar with the original battery specifications;
8. Charge the battery immediately after a battery test in order to prevent deep discharge and capacity loss;
9. Only use the Batterytester indoor;
10. Use of the Batterytester is at one's own risk;
11. Batterytester is not responsible for any battery claims;
12. The guarantee only applies to the Batterytester and in case of not following the instructions set in this manual all claims are excluded;
13. In case of using the Batterytester keep an eye on the proceedings and regularly check the Batterytester.

## Technical specifications

Power supply	12 Vdc, 1A, nominal 2W, peak 12W
IP code	IP20
Battery nominal voltage	6 - 48 Vdc
Working range	3 - 60 Vdc
Battery type	All Lead-based, NiCd, NiMH and Lithium Ion-based rechargeable batteries
Test time	Capacity / I-discharge, example: 10Ah / 5A= 2 hours test time
Discharge current	0.5 – 10 A adjustable (default: 5A)
Cut-off voltage	Adjustable , (default: U open * 0,72)
Fuse	15 A (internal)
Heat dissipation	Max. 500W
Thermal protection	Discharge current is reduced at device temperature > 60 °C
Operating temperature	10 – 40 °C
Thermal Printer	Thermal paper width 57 mm, diameter 32 mm
Accuracy U and I	± 1% ± 2 digits
Accuracy Ri	± 0.1 Ohm

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## Start-up screen



## Battery test report on cashier paper

Battery capacity tester  
AT-03-HCI v8.8

[www.batterytester.nl](http://www.batterytester.nl)

SN:30016

Date = 2018-01-19 15:05

Name = Bosch 36V 8 Amp

Capacity = 7.7 [Ah]

Test-time = 01:18:04 hh-mm-ss

U-Open = 41.6 [V] Volt

Ri average = 0.1 [Ω] Ohm

U Stop = 29.9 [V] Volt

U Min = 30.0 [V] Volt

U average = 38.8[V] Volt

I average = 5.9 [A] Ampère

Capacity = 276 [Wh]

Model tester is AT-03, Software version  
8.80

SN = serial number

Date and time (only when connected to PC)

Name (only when connected to PC)

### **Measured capacity in Ampere hour\***

Testing time in hours, minutes and seconds

Open Voltage

Average internal resistance

Test cut-off voltage (U-Open \*0.72).  
Batterytester turns off when reaching

Lowest measured voltage

Average measured voltage

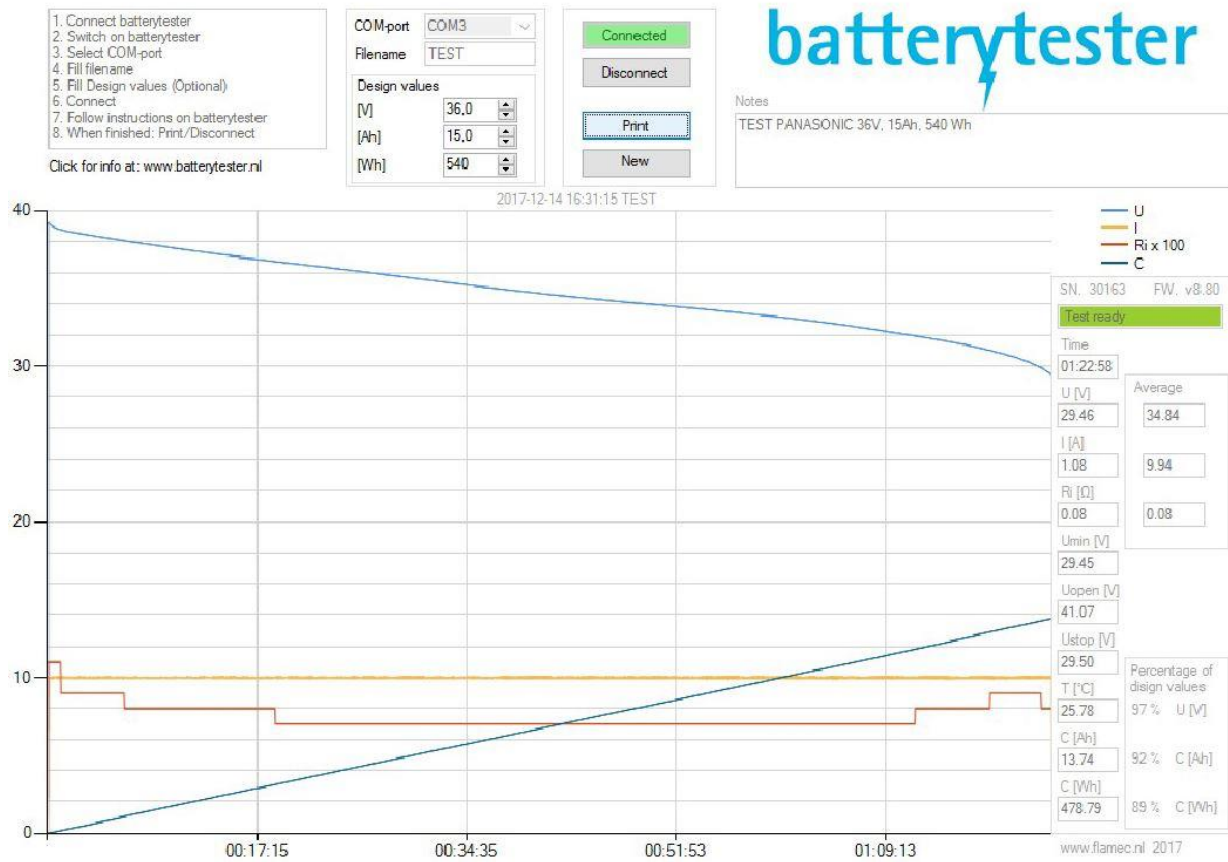
Average discharge current

### **Measured capacity in Watt per hour\***

\* Capacity is real capacity measured during testing, Peukert law is not corrected (only applies to lead batteries).

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## Battery test result when connected to PC /Laptop



## Trouble shooting

No Power USB-mode	No Power, connect 12V power supply and turn on.												
REV./NO connect. Please turn off	Reverse battery polarity, check battery connection.												
Temp= 102 C TO HIGH turn off	Device temperature is too high (> 100C), check ventilation shaft.												
Temp= -8 C TO LOW turn off	Device temperature is too low (< 5C), check temperature, if temperature is < -50 check sensor.												
Current Error Over-Current!	Current too high (>10A) , check battery and connection												
Current Error Under-Current!	Current too low, check battery and connection.												
U= 61.1 V TO HIGH	Battery voltage too high (> 60V) , check battery and connection.												
U= 2.6 V TO LOW	Battery voltage too low (<3V) , check battery and connection.												
I CANNOT SET THE MAX DISCHARGE CURRENT	<p>The maximum discharge current is depending on the battery voltage (see graph). When the temperature of the Batterytester &gt; 60 °C, the discharge current is automatically reduced or set to 0.</p> <div> <table border="1"> <caption>Discharge current data points</caption> <thead> <tr> <th>Battery voltage [V]</th> <th>Max. discharge current [I]</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td></tr> <tr><td>3</td><td>0</td></tr> <tr><td>5</td><td>2</td></tr> <tr><td>20</td><td>10</td></tr> <tr><td>50</td><td>10</td></tr> </tbody> </table> </div>	Battery voltage [V]	Max. discharge current [I]	0	0	3	0	5	2	20	10	50	10
Battery voltage [V]	Max. discharge current [I]												
0	0												
3	0												
5	2												
20	10												
50	10												

## Disclaimer

The information written in this manual has been written carefully. However Batterytester cannot be held liable for the correctness and completeness of this information. Batterytester does not accept any form of liability concerning this and remains the right at all cases to improve the information or to implement any other changes.

All rights remain. It is not allowed to make any changes to this manual in the form of text changes or graphic changes, to distribute, translate or to make this manual available to third parties without the written approval of Batterytester.

For the remainder we refer to the General Conditions of Batterytester which are stated on the following pages and from part of this manual.

## General Conditions Batterytester

### ARTICLE 1. | DEFINITIONS

In the present general conditions, the following terms, also those declined in plural or singular respectively, are used in the following meaning.

1. Batterytester: the user of these general conditions, and a part of Flamec B.V., established on Gildenweg 20, 7021BR in Zelhem, listed in the Trade register under Chamber of Commerce (KvK) number 53834275.
2. Counterparty: any natural or legal person with whom Batterytester has concluded or intends to conclude an agreement.
3. Parties: Batterytester and the counterparty jointly.
4. Agreement: any agreement concluded between Batterytester and the counterparty, by which Batterytester has committed itself, against payment, to sell and deliver products.
5. Products: all matters to be delivered to the counterparty by Batterytester in the context of the agreement, including, though not limited to, battery testing devices, including accessories, and as well as cable components which can be delivered separately.
6. Written: communication in writing, communications by e-mail or any other means of communication, which, with an eye on the current state of technology and commonly held opinion concerning can be equaled to the former.

### ARTICLE 2. | GENERAL PROVISIONS

1. These general conditions are applicable to any offer of Batterytester and to any agreement which is adopted.
2. The applicability of any possible general conditions of the counterparty, regardless of the name by which they are indicated, is emphatically rejected.
3. The provisions in these general conditions can only be deviated from in explicit, written form. If, and to the extent, what is expressly established by parties in writing deviates from the provisions in these general conditions, what parties have established expressly in writing is effective.
4. Annulment or voidness of one or more provisions of these general conditions, or of the agreement as such, leaves unaffected the other provisions. In such case, parties are obligated to engage in mutual consultation with the purpose of making a substitute arrangement with regard to the affected clause. The purpose and substance of the original provision are hereby adhered to as much as possible.

### ARTICLE 3. | OFFERS AND ADOPTION OF AGREEMENTS

1. Sale of the products takes place against the prices as specified in the pricelist communicated by Batterytester to counterparty most recently, under the proviso that if a concrete offer of Batterytester precedes the order of counterparty, including prices, the sale will take place against the prices which are listed in such offer.
2. Prices in pricelists as intended in section 1 are valid for the duration or period expressly specified in these. In the absence of such a duration or period, the pricelist is valid until Batterytester revokes or replaces the pricelist. Batterytester can also revoke the prices in the pricelist with regard to orders of the counterparty which have not yet been confirmed by Batterytester.
3. Batterytester has the right at all times to change its prices, under the proviso that price changes do not affect agreements that have already been concluded.
4. Each agreement is only adopted at the moment that the order of the counterparty is confirmed by Batterytester by e-mail, also in the event the order of the counterparty was preceded by a concrete offer of Batterytester.
5. The counterparty cannot derive any rights from an offer of Batterytester which contains an apparent error or mistake.
6. In case the counterparty concludes the agreement in name of another natural or legal person, they declare by adopting the agreement to be authorised to do so. The counterparty, besides this (legal) person, is severally and jointly liable for the fulfillment of the obligations pursuant to that agreement.

### ARTICLE 4. | DELIVERY OF THE PRODUCTS

1. Unless emphatically established otherwise in writing, delivery of the products takes place Ex Works, in conformity with the most recently applicable version of the Incoterms. The risk of loss and damaging of the products is transferred onto the counterparty at the moment that Batterytester makes available the products to the counterparty.
  2. Regardless of the provision in the preceding section, parties can agree in case of Ex Works that Batterytester will take care of transport. The risk of storage, loading, transport, and unloading will in such case fall to the counterparty as well.
3. In case of forwarding, the products will be delivered to the delivery address indicated by the counterparty. In the absence of a delivery address, the invoice address will be designated as the delivery address. In case of forwarding, Batterytester will determine the manner of shipping the products.
4. Batterytester at all times determines the way the products are packaged.
5. In case the established delivery term is overrun, the counterparty, without prejudice to the provisions regarding default in article 5, never has the right to refuse to accept the products neither/nor to refuse settlement of the amounts owed by them to Batterytester on account of the agreement.
6. If it was not possible to deliver the products due to a circumstance which can be attributed to the counterparty, Batterytester will store the products at the risk and expense of the counterparty, without prejudice to the obligation of the counterparty to settle the amounts owed by them to Batterytester on account of the agreement. The additional costs which are to be incurred in connection with the non-reception by the counterparty as intended here, such as additional delivery costs and storage costs, will be borne by the counterparty. In case storage costs are impossible to determine sufficiently, they will be fixed by Batterytester in a reasonable manner.
7. In case it was impossible to deliver the products due to a circumstance which can be attributed to the counterparty, the counterparty will accept the products in second instance still, within a reasonable term to be set by Batterytester, failing which Batterytester will be authorised to rescind the agreement while the counterparty will be obligated to settle the amounts owed by them to Batterytester on account of the agreement, also including the additional costs as intended in the preceding section.



## ARTICLE 5. | DELIVERY TERMS

1. Batterytester exerts itself to comply with the delivery terms it has committed itself to vis-a-vis the counterparty, but these terms can never be considered fatal time limits. The default of Batterytester will no sooner become effective than after the counterparty has formally notified Batterytester of their default, which notification mentions a reasonable term for compliance, and Batterytester still remains in default with regard to compliance after expiry of the latter term.
2. If Batterytester depends on information which is to be provided by counterparty for the implementation of the agreement, delivery terms no sooner commence than after Batterytester has received this information.
3. In the event of default of Batterytester as intended in section 1, the counterparty has the right to rescind the agreement, without the counterparty being entitled to claim further indemnification than restitution or remission of the established price in proportion to the non-delivered part of the agreement as a result of the default.

## ARTICLE 6. | SPECIAL OBLIGATIONS FOR RESELLERS

1. Batterytester guarantees the counterparty acting as a reseller the constant, established quality of the delivered products. The counterparty acting as a reseller of the products, bears its own responsibility for fulfilling its legal obligations towards its final customers. Without prejudice to the preceding in this section, resale to purchasers of the counterparty takes place at the own risk and expense of the counterparty.
2. Any collaboration between the reseller and Batterytester never is exclusive, unless it is expressly established otherwise; Batterytester has the right to appoint multiple resellers, without any geographical restrictions.
3. Batterytester grants the reseller the right to make use of the brand name of Batterytester ("Batterytester") and of their logos, though exclusively to the extent and for the duration in must be considered reasonably admissible within the framework of the resale activities of the counterparty, and in conformity with all possible instructions of Batterytester with regard to their use. For the use of the brand name of Batterytester and their logos in any other sense than as is intended in the preceding sentence, prior written consent of Batterytester is required.
4. The reseller is obligated to use the brand name and markings applied by Batterytester in connection with the resale of the products. It is not permitted to the counterparty to remove or alter brand names and/or markings of the products, nor to apply their own markings to the products.

## ARTICLE 7. | WARRANTY, INVESTIGATION, AND COMPLAINTS

1. Batterytester will deliver products which comply with the normal trade quality as applicable within the EU. In the event of usage or resale of the products outside the EU, the counterparty itself must verify whether the items are suitable for usage over there, and must ensure that the conditions as are imposed in the relevant country are complied with. For the rest, Batterytester only supplies the products with a warranty to the extent this is expressly agreed on by parties, or to the extent this was specified emphatically by Batterytester upon adoption of the agreement.
2. Without prejudice to their possible claims to warranty, the counterparty must investigate on the moment of delivery whether the nature and quantity of the products correspond with the agreement. In case the nature and/or the quantity of the products in the opinion of the counterparty do/does not correspond with the agreement, they must (let) make note of it on the packing slip. In case the products are picked up by or on behalf of the counterparty, the principle applies that by reception of the products it is tacitly declared that the nature and quantity of the products correspond with the agreement, unless, prior to reception, a reservation is made with regard to it in writing.
3. In the event of reasonably invisible defects, or of such which were otherwise impossible to be aware of at the moment of delivery, of products, the counterparty must communicate such to Batterytester within seven days after discovering the defect, or at least after it should reasonably have been able to discover it, in writing.
4. If the counterparty does not file the complaint on time, such complaint entails no obligation whatsoever for Batterytester.
5. Also in case the counterparty complains on time, their obligation of timely payment to Batterytester remains in effect.
6. Any entitlement to warranty or claims lapses in case a defect to the product has resulted from an external cause or from another circumstance which cannot be attributed to Batterytester. This includes, though not exclusively, defects resulting from damaging, natural wear, incorrect or inexperienced handling, incorrect or inexperienced use, use in violation of or without due regard for the included instruction manual or for other indications of Batterytester, the inexperienced and regular maintenance and application of changes to the products (by third parties), also including repairs of the products which are carried out without the previous written consent of Batterytester.
7. Products can only be returned with the previous written consent of Batterytester, after which, and such at the discretion of Batterytester, full or partial refund or remission will be provided, or alternatively repair or replacement, exclusively in the event of a shortcoming of Batterytester or of a valid warranty claim by the counterparty. Products are returned at the own risk and expense of the counterparty.
8. The counterparty can only appeal to the warranty on condition it has fulfilled the payment obligations towards Batterytester it is subject to on account of the relevant agreement.

## ARTICLE 8. | FORCE MAJEURE

1. Batterytester is not bound to fulfill any obligation pursuant to the agreement if, and for as long, it is obstructed from doing so by a circumstance which pursuant to the Law, to a legal action, or according to commonly held opinion, cannot be attributed to it.
2. If the situation of force majeure permanently renders compliance with the agreement impossible, parties have the right to rescind the agreement with immediate effect.
3. If Batterytester upon entry into effect of the situation of force majeure has already partially fulfilled its obligations, or is still able to partially fulfill its obligations, it has the right to invoice the part already delivered, or the part still to be delivered respectively, separately as if it regards an autonomous agreement.
4. Damage as a result of force majeure, without prejudice to the application of the previous section, is never eligible for compensation.

## ARTICLE 9. | SUSPENSION AND RESCISSION

1. In case the circumstances of the case reasonably justify such, Batterytester is authorised to suspend the implementation of the agreement or to completely or partially rescind the agreement with immediate effect, if:
  - a) the counterparty does not, not timely, or not fully comply with its (payment) obligations; or,
  - b) after adoption of the agreement, circumstances come to the cognisance of Batterytester which are grounds to fear that the counterparty will not fulfill its obligations, the counterparty has been requested to pledge security for compliance and this security has failed to materialize within a reasonable term stipulated for it by Batterytester.
2. If fulfillment of the obligations of the counterparty with regard to which it falls short as intended in section 1 under a, is not permanently impossible, the competence to rescind only becomes effective after the counterparty's default has been notified in writing, in which notification a reasonable term is stated within which the counterparty is still able to fulfill its obligations and fulfillment has still failed to be provided after expiry of the latter term.
3. The counterparty is obligated to compensate the damage which Batterytester suffers as a result of the suspension or rescission of the agreement.
4. In case Batterytester rescinds the agreement on grounds of this article, all claims on the counterparty become immediately payable.

## ARTICLE 10. | PRICES, SHIPPING COSTS, AND PAYMENTS

1. All prices listed by Batterytester are exclusive of VAT and of any other possible government levies. Unless expressly established otherwise, any possible delivery costs are additionally borne by the counterparty.
2. Payments must be made in the manner indicated for them by Batterytester.
3. If not emphatically established otherwise, Batterytester has the right to demand partial or full advance payment of the amount due to Batterytester. If Batterytester demands such, Batterytester will not be held to deliver the products any sooner than the advance payment has been received by Batterytester.
4. In case of payment after delivery, payment must take place by way of bank transfer, within 14 days after invoice date.
5. Batterytester has the right to exclusively provide the invoices directed to the counterparty by way of e-mail.
6. In case the counterparty is declared bankrupt, has applied for (temporary) suspension of payment, or any of their assets have been seized, or in cases in which the counterparty is otherwise unable to freely dispose of its assets, the claims on the counterparty become immediately payable.
7. In the absence of timely payment, the default of the counterparty becomes legally effective. From the day that the default of the party enters into effect, the counterparty owes a monthly interest of 2% over the outstanding amount, whereby a part of a month is considered as an entire month.
8. All reasonable costs, such as judicial, extrajudicial, and enforcement costs, incurred to obtain the amount owed by the counterparty on account of the agreement, are borne by the counterparty.

## ARTICLE 11. | LIABILITY AND SAFEGUARDS

1. To use battery testing devices delivered by Batterytester, knowledge of battery technique is required. Batterytester advises end-users to acquire knowledge of battery technique through education, a course, or training which are certified to that effect. The reseller is responsible for providing this information to its purchasers. Batterytester does not accept any liability for damage (both caused to batteries for which the delivered product is used, and otherwise), caused by the incorrect or inexpert handling of the product, by the incorrect or inexpert application of the product, and by use of the product which violates or is non-compliant with the instructions manual included or other instructions of Batterytester. Furthermore, Batterytester does not accept any liability for damage caused as a result of the lack of a product, which lack has occurred as a consequence of an external cause or of another circumstance which cannot be attributed to Batterytester, including, though not limited to, defects as a result of damaging, natural wear, the inexpert and regular maintenance and application of changes to the products (by third parties), which also includes repairs which are carried out without the previous written consent of Batterytester.
2. The counterparty sustains the damage caused by inaccuracies or incompleteness of the information provided by the counterparty, which emphatically includes the information regarding the delivery address. In addition, the counterparty sustains the damage caused by shortcomings in the fulfillment of the obligations of the counterparty pursuant to the Law or the agreement.
3. Batterytester is never liable for consequential damage, which also includes loss of profit, losses incurred, and damage resulting from operational stagnation.
4. In the event Batterytester were to be liable for any damage, Batterytester will at all times have the right to repair this damage. The counterparty must enable Batterytester, failing which all liability of Batterytester concerning will lapse.
5. Brring intent and gross negligence on their part, the liability of Batterytester is always limited to a maximum of the invoice value of the agreement, or at least of that part of the agreement which the liability of Batterytester regards. In case the damage for which Batterytester may be liable, notwithstanding the provisions in the rest of these general conditions, were to be excessive, such liability will be limited to no more than the amount which in the relevant case is effectively disbursed on account of the business liability insurance taken out by Batterytester, increased by any possible deductible of Batterytester which is applied pursuant to that insurance.
6. In derogation to the statutory limitation term, the limitation term of all legal claims on Batterytester amounts to one year.
7. The counterparty and especially the reseller of the products, safeguards Batterytester against any potential claims by third parties that incur damage in connection with the implementation of the agreement, and of which the cause cannot be attributed to Batterytester. If Batterytester were to be addressed by third parties on such account, the counterparty will be obligated to support Batterytester both extrajudicially and judicially, and to immediately carry out all such things which may reasonably be expected of them in such case. Were the counterparty to fail in the taking of adequate measures, Batterytester will have the right, without any default notice, to take such measures itself. All costs and damage on the part of Batterytester and of third parties that have resulted, will be integrally at the risk and expense of the counterparty.

## ARTICLE 12. | RETENTION OF PROPERTY

1. All products will remain the property of Batterytester until the counterparty has fulfilled all its payment obligations towards Batterytester pursuant to the agreement.
2. Barring the extent to which such must be considered admissible in the context of their regular operations, it is forbidden to the counterparty to sell, subject to liens, or burden in any other way the products which fall under the retention of property.
3. The counterparty is obligated to store the products which are delivered under retention of property with due care and in a way that it is recognisable as the property of Batterytester.
4. In case third parties seize the products which are subject to the retention of property, or if they wish to establish or enforce rights with regard to them, the counterparty is obligated to inform Batterytester accordingly as soon as possible.
5. Upon the sale and/or delivery by the counterparty to third parties in the context of their regular business operations, as well as upon violation of the other provisions of this article, the purchase price will become immediately payable.
6. The counterparty grants unconditional permission to Batterytester or to third parties indicated by Batterytester to enter all those areas where the products which are subject to the retention of property are located. The counterparty must provide Batterytester information upon their first request so as to allow them to exercise their property rights, and such on pain of an immediately payable fine of € 500 per day that the counterparty fails to comply, and without Batterytester needing to formally declare the default of the counterparty. All reasonable costs in connection with the exercise of the property rights of Batterytester will be borne by the counterparty.
7. If the counterparty, after the products have been delivered to them by Batterytester, has fulfilled their obligations, the retention of property with regard to these products will revive in the event the counterparty does not fulfill their obligations pursuant to an agreement concluded later.

## ARTICLE 13. | INTELLECTUAL PROPERTY

1. To the extent these rights do not legally lie with third parties, Batterytester reserves itself all rights of intellectual property with regard to the products, to the software included with the battery testing devices, as well as to the brand name "Batterytester" used by them, and to text and visual material and any other content of whatever nature depicted on their website or otherwise. It is forbidden to the counterparty to (let) multiply these matters, to (let) forge them, to (let) reproduce them, or to (let) divulge or distribute them as well as to use them in any other way than what follows from the nature or substance of the agreement, the possible resale activities of the counterparty and the normal use of the website respectively.
2. A violation of the provisions of the preceding section which can be attributed to the counterparty invests Batterytester with the right to demand immediate elimination of the violation, as well as a compensation of damages which must be further determined on the basis of the nature and dimensions of the violation.

## ARTICLE 14. | FINAL PROVISIONS

1. To any agreement, and to all legal relationships between parties flowing from such, Netherlands legislation is exclusively applicable.
2. Parties will no sooner make an appeal to the court of law than after they have given their best effort to resolve the dispute through mutual consultations.
3. Only the competent court in the district of the place of establishment of Batterytester is designated to take into consideration any possible judicial disputes.
4. In case these general conditions have been made available in multiple languages, the Dutch version of the present general conditions is leading at all times with regard to the interpretation of the clauses included in them.