BATTERY LOAD TESTER

12V 420A

RS232

General Description:

The battery tester is capable to perform the following tasks with 12V batteries:

- measures the starting ability, EN/2 (A), 15 sec, 9.6V
- measures the starting ability according to the EN standard
- measures the C20 capacity or the reserve capacity (RC 25A) of the battery
- controls 12V generators
- connecting 2-3-4 pcs of battery testers parallelly, we can get 1680A (according to the 1520A EN standard)

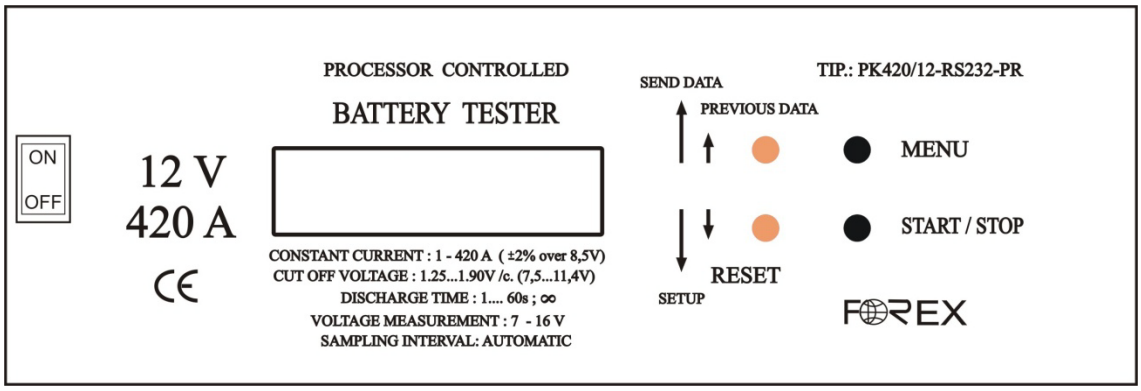
Technical Parameters:

Discharging currents:	1 A – 28 A with 1 A steps, 30 A - 420 A with 5 A steps.
Current stability:	Better than: +-2% or +-0.2 A
Average current accuracy:	< +/-1% or +/- 0.1 A
Cut off voltage:	9 V to 13.8 V +-2% current accuracy
	7.5 V to 9 V Imax = 380 A
Switch off voltages:	7.5 V to 11.4 V (in 0.3A steps)
Voltage measuring:	7.5 V to 16 V
Accuracy:	1%<
Discharging time:	1 - 60 sec, or infinite time. For infinite time, the current can be maximum 220A
Sampling time:	Automatic
Discharged Ah measurement :	0.1 – 1000 Ah 0.4% accuracy

Number of possible measurement: 14

Parallel connection: Max. 4 pcs of testers can be connected, the connection set is an optional element.

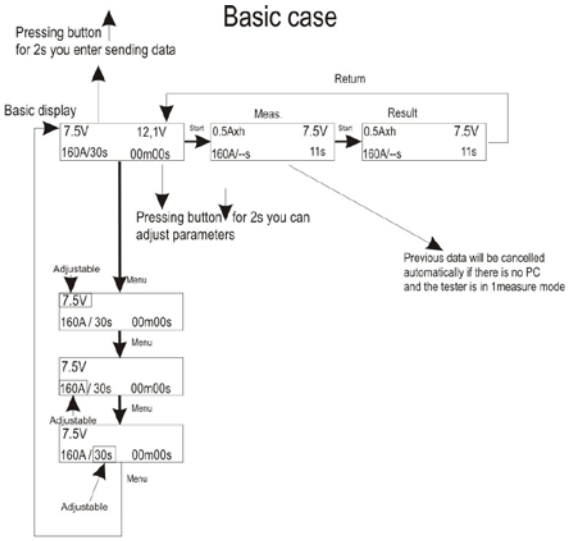
Operating Device

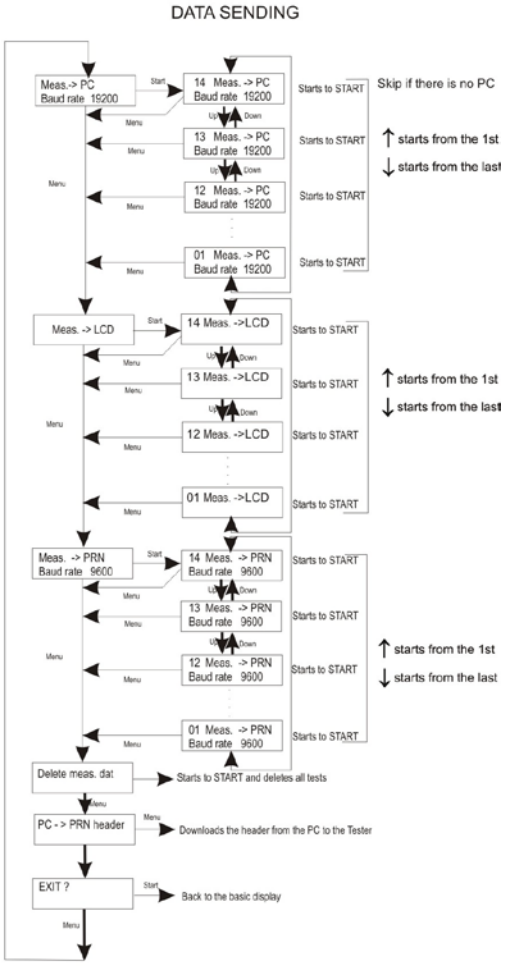


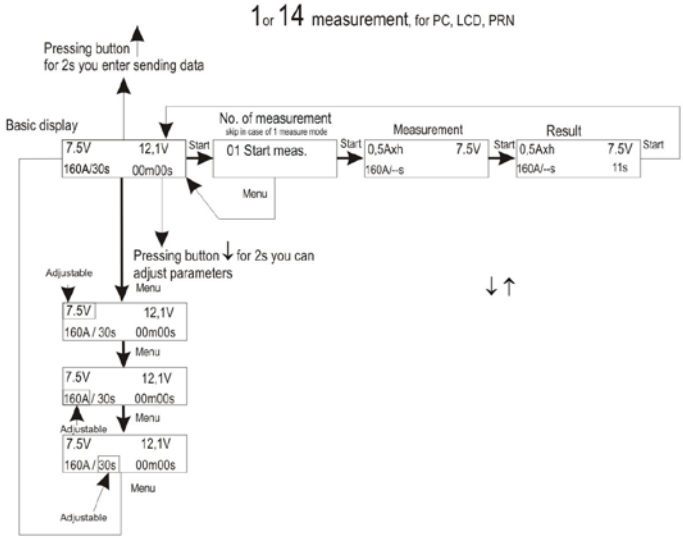
- ON / OFF: I/0 - to switch on and off the tester
- START / STOP - starts or stops measuring
- RESET - clears the measuring result from the display
- PREVIOUS DATA - shows result of last measuring
- SEND DATA – data sending, it will open the menu for data sending
- SETUP – Parameter setting, it will open the menu for parameter settings
- MENU - starts the menu for setting parameters

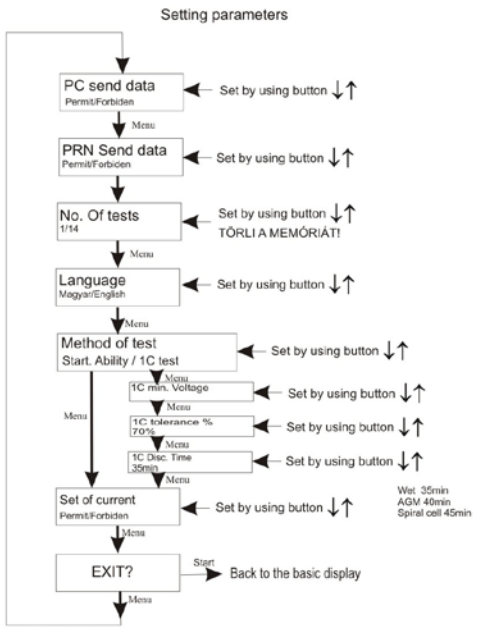
Check further functions of the buttons at menu.

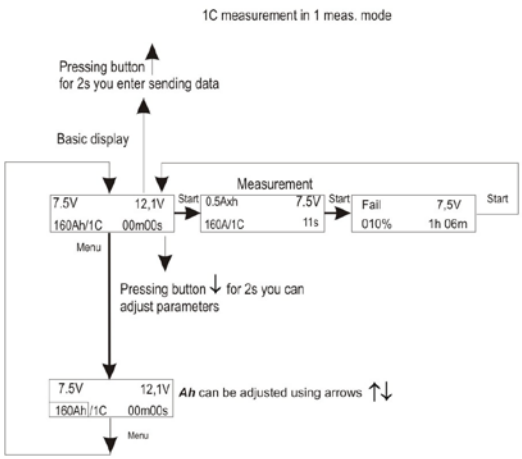
Menu system (SW 6.0)











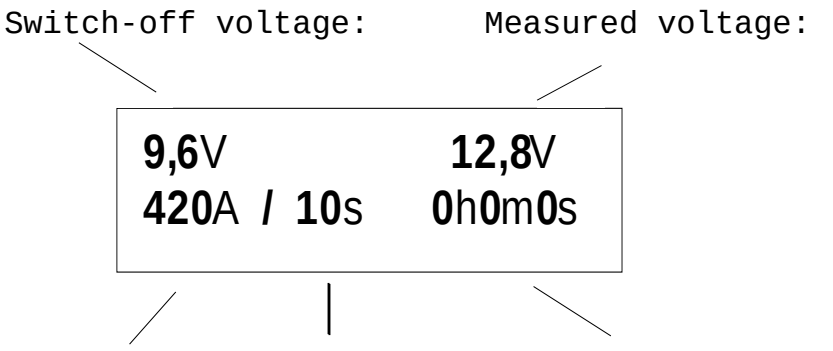
Basic settings:
1., There is PC
2., No. of measurements = 14
3., PRN (no printer)
4., Language: English
5., Starting ability test
6., Current setting adjustable

Setting up for measurement

1. Basic case (see menu system)

Parameters set:
- 1 or 14 measurements
- Starting capacity measurement

By switching the device ON you'll see the following image:



For a measurement with completely the same parameters as the previous one, press the START button. By pressing the START button, the measurement will start.
At the end of the measurement you will see the discharged Axh and the time of the test on the display.

For a measurement with new parameters set the data by the following method:

At the starting screen, press the MENU button.
The cursor will blink at the switch-off voltage.
With the up and down arrows ↑↓ on the display you can set the proper final voltage.
For the measurement of a general starting ability the switch-off voltage is 9,6V.

By pressing the MENU button again the cursor jumps to the discharge current now you can set the constant flowing current using the up and down arrows. Generally for measuring the starting ability, set the half of the starting current value EN/2 given according to the EN standard.

By pressing the MENU button again You can set the time of discharging.
The range can be set from 1 to 60 sec or in case of measuring capacity to infinite time.
For measuring the starting ability set 15sec in general.
By pressing the MENU button again you'll get back to the basic screen, where by pressing the START button you can start the test.

Warning! In „one measure" mode, if the PC data sending is turned off, the starting of the new measurement will cancel automatically the results of the previous measurement.

In „14 measurements" mode, the settings are the same as the „one measurement" mode settings.
However, the next measurement will not cancel the previous one. Plus, by pressing the MENU button again at the basic screen, you will see the number of the next measurement.
By pressing the MENU button right again the next measurement will start.
This will happen until the 14 measurements are finished.
After the 14 measurements the device will offer the possibility of sending data to the PC (if there is) or the delete of the results.
After 14 measurements you can start a new one only after clearing the memory.

2. 1C measurement (see menu system)

Parameters set:

- 1 or 14 measurements,
- 1C discharging

1C measurement means a dischargement with the adequate constant current for the 20hrs AH capacity's value of the battery.
This means a fast, but still an accurate capacity measurement.
After an 1C measurement the previously charged and healthy battery will still remain able to start.
At the basic screen of the 1C, by pressing the MENU button you only can set the battery's Ah capacity, with the up and down arrows.
The dischargement's final voltage, the discharge time for the 100% "status", and the qualificational limit value can be set at the PARAMETERS.
The current will be set automatically for the capacity, by the tester.
By pressing the MENU again you'll get back to the basic screen and by pressing then the START button You can start the next measurement.
The result of the 1C measurement is a time, and a % value and a qualification made by these: good battery – bad battery.
Tipical 1C measurement setting: Set between the parameters a 9.6V voltage limit;
for ex. at liquid type starting batteries 35 minutes for the 100% battery, and give for ex. 60% for the good or bad qualification's limit value.

You can interrupt the measurements anytime by pressing the STOP button.
But starting again will be a new measurement.

For a restarting the amper x hour display should be erased by pressing the RESET. After this we can start the tester from the basic case. By pressing the RESET again we can read the voltage at that current time. Suggested measuring for **starting ability** Load the battery with half of the starting current suggested in EN for 15 seconds. During this time the voltage of the battery able to start can not drop under 9.6V, not even after 2-3 following discharges.

STANDARD EN STARTING ABILITY MEASUREMENT

Load the battery which is cooled down to –(minus)18°Celsius degrees with the starting current suggested in EN for 10 seconds. During this time the battery can't drop down under 7.5 V.
With one tester max. 380 A, with four 1520 A discharging current can be reached 'till 7.5 V.

Measuring capacity: (reserve capacity)
Reserve capacity: set the voltage limit to 10.5V, 25 A load current, infinite time, then start the measurement according to the above. At the end of the measurement we can read the measured reserve capacity (RC) of the battery in minutes.

Measuring by 1×C-: Set 9.6V bottom voltage , 1×C(A) discharge current, infinite time, then start measuring. By the T/min shown at the end of the measuring the 20 hour capacity can be easily calculated with a simple antecedent. At a 100% wet batteries can provide 1×C for 35 minutes.

Generator testing */option /:*
Connect the tester to the battery installed in the car. Set the voltage limit to 10.5 V, current to 1A, time to infinite /--/. Start the tester. The current can be set under loading, by this defining the load capacity of the generator (up to 13,6V!!)

Analysing the Results

At the end of the measurement we can read the voltage and time values, we can see which reached, passed the values set. We can read the amount of chargement which we took out. But, these are not in the memory, by pressing the RESET or START buttons these data will be forgotten by the device.

Parameter setting menu

You can get to the Parameter Adjusting menu by pressing the DOWN ARROW for 2seconds at the basic screen. Here you can set the parameters which are in connection with the operation of the device and the measurement.
These are the followings:

PC DATASENDING: with this function You can set the option of sending the data to a PC.
PRN DATA SENDING: Permit/Forbid functions you can allow printer if you have (optional)
NR OF TEST: You can set the number of the measurements, 1 or 14.
LANGUAGE: You can change to English or Hungarian
At the METHOD OF MEASUREMENT: You can change between Starting Ability Measurement/1C measure functions.
WARNING! This function erases the memory without warning when changing.
At the Starting Ability mode You can set the discharging voltage, discharge loading power and the time of the discharging.
In 1C mode You only have to set the battery's 20hrs Ah capacity, because the tester sets the other parameters automatically.

1C minimum voltage: base value: 9.6V
Discharging power: similar constant to the Ah capacity's value The current (A) is set by the tester.
1C allowance, tolerance level: Base value: 70%
1C discharging time: the base time for 100%=35 minutes /Suggested values IF the producer of the battery hasn't provided other values:
Wet type battery : 35 minutes,
AGM battery : 40 minutes,
Spiral celled battery: 45 minutes

At the Current Setting Permit/Forbid function you can set the option of changing the loading current during the starting ability measurement. (for ex. at a generator test it is necessary to increase the current)

The parameters basic settings:
1: PC – there is PC
2: Nr. of measurements=14
3: PRN – NO PRINTER
4: Language: English
5: Measure mode: starting ability test
6: Current Setting Adjustable

DATASENDING Menu

From the basic screen by pressing the UP arrow for two seconds You can get to the "sending data" menu.
In this menu you can send the results to PC, printer, display, and you can upload the tester's data which appear in printing. (for ex. data's of the company, etc.)
In this menu You have the opportunity to erase the measured values.

Downloading to PC:

During the test the tester stores the measured data in its own memory. The stored data can be loaded to the
PC by RS232 serial port for further analysis, printing or storing.
For this, go into the Data sending menu by pressing the UP arrow for two seconds, and then choose the „measurement to pc" function by pressing the START button. After this, by pressing the UP arrow You can transfer each measurement starting from measurement 1.
(About the PC program we'll write below)
You can reach the last measurement by pressing the DOWN arrow.
You can start the sending of the chosen results by pressing the START button.

Press *FILE-Read measure* menu or *Read measure* icon, then set the transfer speed to 19200 baud. Pressing the **Menu - ↓ - Start - Start** buttons on the tester step into "Test > PC" menu point, then if You have made several tests, select the required test by the ↑↓ buttons. Then press START button. Test results then are downloaded to the PC and then can be analyzed in the programme.

Data on the display:
At the data sending menu step to the Measurement LCD, and choose the adequate measurement and press the Start to have it on the screen.

Data sending the serial port printer: (the serial port printer is optional, it can be ordered separately)
At the data sending menu step to the Measurement PRN, and choose the adequate measurement and press the Start to send to the printer.

Deleting data from the memory:
The tester can hold max. 14 measurements in it's own memory. If you want to do further measurements you have to erase from the memory.
To perform this task, go to the data sending menu by pressing the UP arrow for two seconds, here choose the DELETE function by the start button. By pressing the START button again all of the measurements will be deleted from the memory.

WARNING! If you change between the 1 and 14 measurements or between starting ability measurement and 1C measurement IN the Parameter setting menu, the memory will be deleted immediately without warning!

Header, title data transferring from PC to the tester for serial port printers:

You can send the data which appear when printing from the PC program, to the connected tester, for serial port printers – the following way:

Header transferring from PC to the tester for serial port printers:
Connect the tester to the PC. You can find the menu for this task at FILE-HEADER.
You can change the header which appears on the printing in this menu.
At the data sending menu, go to the Header function and then press the start button.

Data loading:
The PC program (**AKKU.EXE**) does not need installation, it is enough if You save it to a HDD. Connect the tester through a RS232 serial port. Start the **AKKU.EXE** program on the PC.

Set the serial port in the software.
Press **FILE-Read measure** menu or **Read measure** icon, then set the transfer speed to 19200 baud. For transferring go into the Data sending menu by pressing the UP arrow for two seconds. Pressing the **Menu - ↓ - Start - Start** buttons on the tester step into "Test > PC" menu point, then if You have made several tests, select the required test by the ↑↓ buttons. Then press START button. Test results then are downloaded to the PC and then can be analyzed in the program.

Self-checking function:

At the end of the test the tester switches on the relays used during the test one by one, to check if they operated correctly, if the test was longer than 3 seconds. If there is a wrong connection or relay, it displays an error message is displayed. This is possible to clear with the Reset button and the test results can be seen but it is possible that the discharge current was less than that was selected, because of a relay fault. Repeat the test and have the tester repaired.

System of testers:

The elements of the system are 12V/420A testers, that can function one by one as a separate testers. It is possible to connect maximum 4 testers at a time to the paralleling device by the help of an RS232 cable. One of the 4 testers is of an advanced function tester, a so called Master, while the other three are of equal positioned Slaves.
A Master always has to have a tester connected to it. The number of Servants can be 1, 2, 3 depending on the necessary discharge current. The below table shows the possible discharge currents .

Slave	Max. current	Min. current	Max. current by infinite time
1	840A	200A	320A
2	1260A	300A	480A
3	1680A	400A	640A