# Argus AA Series

## DIGITAL BATTERY AND SYSTEM ANALYZERS



**Battery and system diagnostics** have never been so simple, with results so complete, clear and useful. The Argus AA Series hand-held battery analyzers combine two patented technologies – CrankCheck™ and Large Pulse Resistance™ – that dramatically improve battery testing accuracy and simplicity, painting a comprehensive picture of battery health.

For today's busy automotive service technician, the AA500P with test report printer quickly identifies batteries that need replacement. The thermal printer provides an immediate, data-packed test report, concluding with a recommendation to *Replace Now*, *Replace Soon*, or *Continue to Use*.

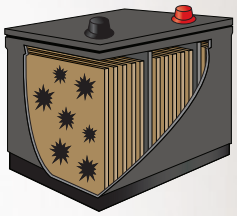
Automotive, as well as marine and RV service professionals, will find the features and price points of the AA350 and AA400 models appealing. Measuring both capacity and cranking ability, the AA400 tests the performance of both starting systems and batteries, while the AA350 is ideal for bench-testing or testing batteries not used for engine starting.

WE MAKE BATTERY TESTING EASY

## COMMON BATTERY AGING
THE PROCESS OF SULFATION

DISCHARGED

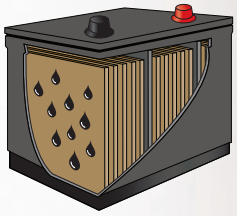
E F



Liquid acid forms lead sulfate "crystals" on the battery's lead plates during discharge.

RECHARGED

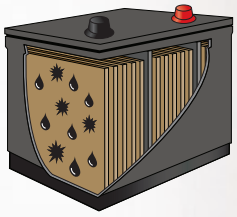
E F



In a *perfect* world, these crystals re-dissolve upon recharge, keeping the battery at full capacity.

RECHARGED

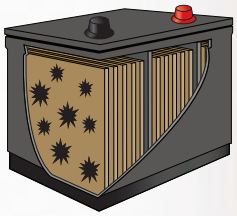
E F



In the *real* world, some crystals remain permanently stuck on the plates over time, *reducing* the battery's capacity to store energy.

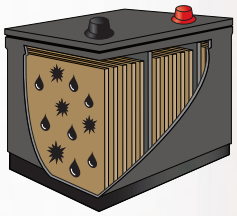
DISCHARGED

E F



Eventually, the battery will lose so much capacity that it is no longer useful in its application.

## MEASURING BATTERY CONDITION



Electrical resistance inside the battery increases as capacity is lost due to sulfation and other decay processes. Using Large Pulse Resistance™ (LPR) technology, a battery's internal resistance and condition can be accurately measured.

**New Battery**

E F

Capacity = 100% of Spec

**Old Battery**

E F

Capacity = 30% of Spec

Liquid acid  Lead plates  Crystals

# Large Pulse Resistance™ Technology

The Argus patented Large Pulse Resistance (LPR) technology brings unmatched speed and accuracy to battery testing. In less than one second, Argus testers measure battery health, making it worthwhile to test every vehicle that passes through the shop—increasing battery sales and profits.

Argus LPR technology draws a large load current pulse from the battery for a very short period of time and simultaneously measures the voltage of the battery. Using Ohm's law (V = I*R), the tester directly measures the DC internal resistance of the battery.

The internal resistance is correlated to a cold cranking amp (CCA) value for a particular battery and state of charge. As internal resistance increases, the battery's CCA decreases.

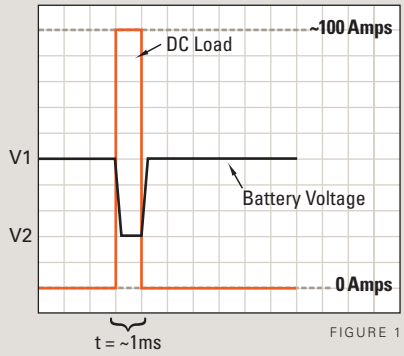



FIGURE 1

The Argus LPR test has the strengths of traditional load testing and AC Conductance testing, while overcoming the disadvantages of both methods.

The large (~100Amp) pulse load enhances detection of mechanical defects, while the short test time (<1ms) avoids discharging the battery. Additionally, advanced software algorithms allow LPR testing of batteries discharged down to 20% state of charge, substantially reducing overall test time.

While inexpensive traditional load testers can distinguish between working and failed batteries, the precision of the LPR technology determines the remaining battery life from 0% to 100%. This method identifies weak batteries *before* they fail, increasing customer satisfaction and enhancing profits at the service center.

# CrankCheck™ Technology

Today's conventional battery testing tools, such as load testers and AC conductance testers, fail to answer the single most important question about a starting battery: *How well can this battery start the engine that it is attached to?*

These limitations of conventional testing led to the development of Argus CrankCheck™ technology, which uses the actual engine starting sequence to evaluate battery performance.

CrankCheck measures the battery voltage drop as the starter motor engages. As a battery ages, this voltage drop increases.

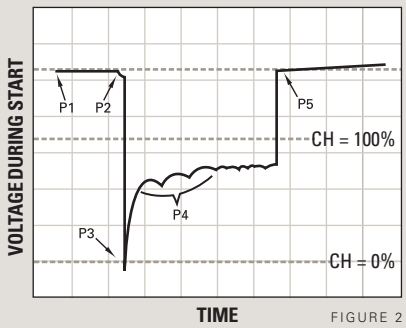



FIGURE 2

The user does not need to know the battery specification, rating, size, nor details about the motor. The voltage profile indicates the relative performance of *that* battery, starting *that* engine—the most important characteristic for determining actual engine starting performance.

# Combining These Two Technologies

The Argus AA400 and AA500P handheld testers combine LPR and CrankCheck technologies to provide a dual view of battery health—an absolute measure of performance using Large Pulse Resistance technology, and a relative measure of performance using CrankCheck technology. This combination delivers the most comprehensive analysis of the battery and vehicle starting system.

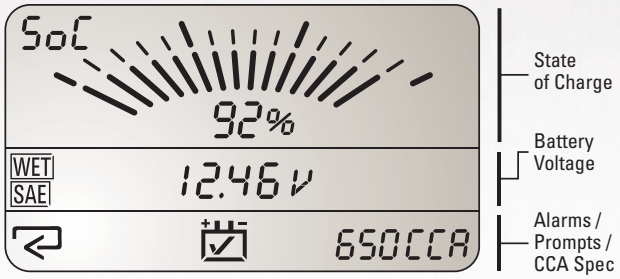
## Logical Displays

Argus displays are clear and intuitive, providing users with a wealth of data. The graphical display offers at-a-glance understanding of key battery performance characteristics with icons and audible alarms highlighting critical battery problems.

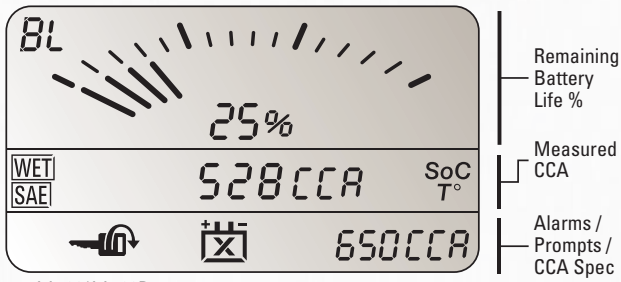
**State of Charge (SoC) Data Screen** displays basic battery information.

**Battery Life (BL) Data Screen** shows the results of the Argus LPR test. The display indicates the percentage of remaining battery life, which is a comparison of the measured CCA value and the CCA specification for the battery (see #2 below for details). The values used in this calculation are automatically corrected for non-standard temperature and non-standard state of charge. The results of this test are summarized by pass / fail icons.

**Cranking Health (CH) Data Screen** shows the results of the Argus CrankCheck test. The display indicates the cranking health of the battery as a percentage. The lowest voltage measured during the engine start is also displayed. After the engine starts and the alternator begins charging, the tester measures charging voltage and diode ripple. These test results are summarized by pass / fail icons.



AA400/AA500P

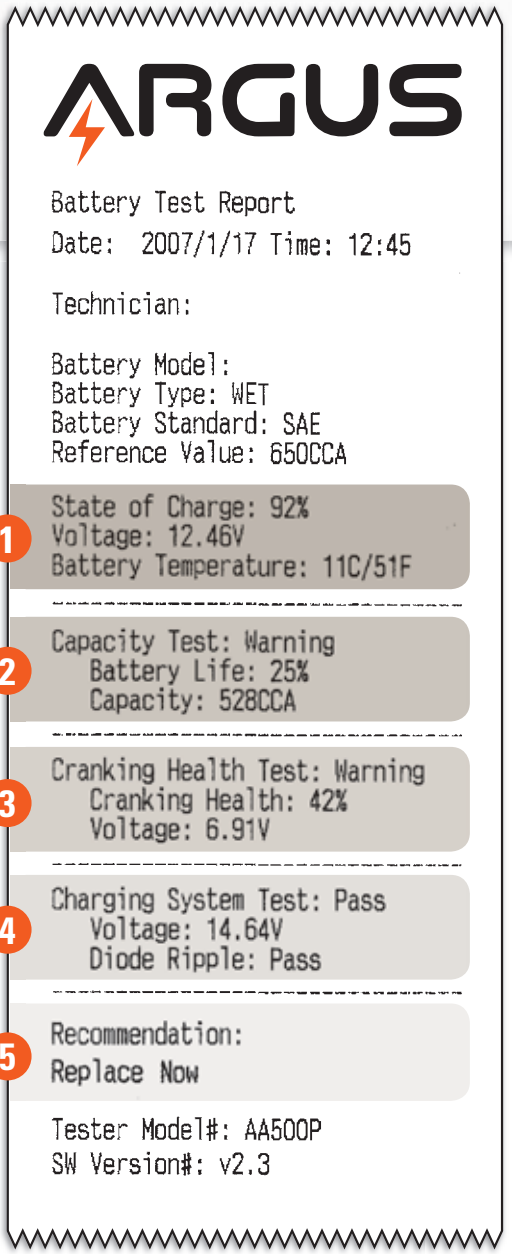


AA400/AA500P

**Alarms Legend**

- Battery Pass
- Battery Fail
- Alternator Pass
- Alternator Fail
- Start Engine prompt for CrankCheck test

AA400/AA500P




## Data-packed Printouts

The AA500PWP with thermal printer quickly identifies weak batteries and can print a test report to support a technician's recommendation to replace a battery. The report, printable in 19 languages, provides immediate documentation with a data-packed recommendation to *Replace Now*, *Replace Soon*, or *Continue to Use*.

### 1 Basic Battery Info

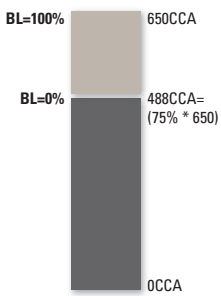
- State of charge
- Battery voltage
- Battery temperature

### 2 Battery Life Remaining

- Results of the Argus LPR test

Battery manufacturers consider a battery has reached 'end-of-life' (BL=0%) when the measured capacity is 75% of the manufacturer's specified reference value.

EXAMPLE: 0% Remaining Battery Life would occur when *measured* CCA is 488CCA (=75%* 650CCA)




### 3 Cranking Health

- Results of the Argus CrankCheck test
- The printed report shows the cranking health percentage and the lowest starting voltage that was measured *(Figure 2)*

### 4 Charging System Test

- Alternator voltage test
- Alternator diode ripple test
- The results are pass / fail

### 5 Recommendation

The overall battery recommendation is a logical conclusion based on the Argus LPR test and the Argus CrankCheck test.




| | AA200 | AA350 | AA400 | AA500P† |
|---|---|---|---|---|
| **DESCRIPTION** | | | | |
| | Digital Battery Analyzer for reliable engine starting | Digital Battery Analyzer for battery bench testing | Advanced Battery and System Analyzer for service professionals | Advanced Battery and System Analyzer for service professionals |
| **TECHNOLOGY** | | | | |
| LPR tests | No | Yes | Yes | Yes |
| CrankCheck tests | Yes | No | Yes | Yes |
| Alternator tests | Voltage only | Voltage only | Voltage & diode ripple | Voltage & diode ripple |
| **OPERATING PARAMETERS** | | | | |
| System voltage | 12V | 6V or 12V | 6V or 12V | 6V or 12V |
| Input voltage range | 9 – 16VDC | 5 – 16VDC | 5 – 16VDC | 5 – 16VDC |
| Power requirements | None | None | None | None |
| Operating temp | -10C to 60C | -10C to 60C | -10C to 60C | -10C to 60C |
| Battery size testing range | 30-2000 CCA | 30-2000 CCA | 30-2000 CCA | 30-2000 CCA |
| Test clamps | Dual contact clamps, dual conductors | Dual contact clamps, dual conductors | Dual contact clamps, dual conductors | Dual contact clamps dual conductors |
| Test time | <1 second | <1 second | <1 second | <1 second |
| Safety standards | CE | CE | CE | CE |
| Post test review of data | Yes | Yes | Yes | Yes |
| Warranty | 2 years | 2 years | 3 years | 3 years |
| **DISPLAY AND INTERFACE** | | | | |
| Buttons | One | Three | Three | Three |
| Display type | LCD | LCD w/ backlight | LCD w/ backlight | LCD w/ backlight |
| Display information | Digital, graphical, icons | Digital, graphical, icons | Digital, graphical, icons | Digital, graphical, icons |
| Optional printer | No | No | No | Yes† (AATPR10) |
| **BASIC BATTERY AND SYSTEM DIAGNOSTICS** | | | | |
| State of charge (SoC)* | Graph and % | Graph and % | Graph and % | Graph and % |
| Bad cell detection | Yes | Yes | Yes | Yes |
| Volt meter mode | Yes | Yes | Yes | Yes |
| Reverse wiring protection | Yes | Yes | Yes | Yes |
| Battery pass/fail indication | Icon, audible | Icon, audible | Icon, audible | Icon, audible |
| **LPR™ BATTERY LIFE DIAGNOSTICS** | | | | |
| CCA test (Large Pulse Resistance) | No | Yes | Yes | Yes |
| Battery norms supported | All | SAE, EN, DIN, IEC | SAE, EN, DIN, IEC | SAE, EN, DIN, IEC |
| Battery types tested | All | WET/MF, VRLA/AGM | WET/MF, VRLA/AGM | WET/MF, VRLA/AGM |
| Present capacity (CCA, A) | No | Yes | Yes | Yes |
| Remaining battery life % analysis* | No | Yes | Yes | Yes |
| Battery life warning indicator/alarm* | No | No | Yes | Yes |
| Battery internal resistance | No | No | No | Yes |
| State of charge compensation* | No | Yes | Yes | Yes |
| Temperature compensation | No | Automatic, continuous | Automatic, continuous | Automatic, continuous |
| **CRANKCHECK™ STARTING SYSTEM DIAGNOSTICS** | | | | |
| Starting system analysis | Graph and % | No | Graph and % | Graph and % |
| Measurement mode | Real time, engine load | No | Real time, engine load | Real time, engine load |
| Low voltage capture | Yes | No | Yes | Yes |
| Crank performance warning indicator | Yes | No | Yes | Yes |
| **CHARGING SYSTEM DIAGNOSTICS** | | | | |
| Alternator pass/fail indication | No | No | Yes | Yes |
| Alternator voltage | Yes | Yes | Yes | Yes |
| Diode ripple test | No | No | Yes | Yes |
| Over/under-charging indication | No | No | Yes | Yes |
| **PHYSICAL SPECIFICATIONS** | | | | |
| Dimensions | 17.1 x 7.9 x 2.5cm | 17.1 x 7.9 x 2.5cm | 17.1 x 7.9 x 2.5cm | 17.1 x 7.9 x 2.5cm |
| Weight | 260g | 260g | 260g | 260g |
| Housing | ABS plastic (IEC 68-2-32) | ABS plastic (IEC 68-2-32) | ABS plastic (IEC 68-2-32) | ABS plastic (IEC 68-2-32) |
| Protective case | None | Ballistic™ Nylon | Ballistic™ Nylon | Ballistic™ Nylon |

**12V nominal batteries only*

*†AA500P and the AATPR10 thermal printer available as a combined system, Model No. AA500PWP*

ARGUS® ANALYZERS

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