

# 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.

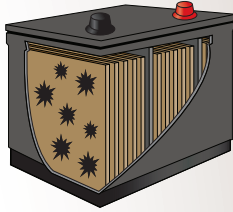


WE MAKE BATTERY TESTING EASY

## COMMON BATTERY AGING THE PROCESS OF SULFATION

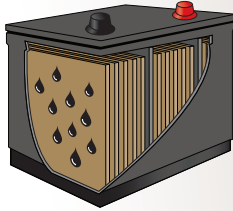
DISCHARGED  
E F

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



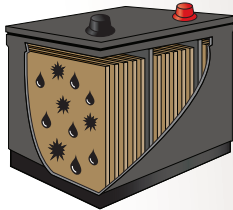
RECHARGED  
E F

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



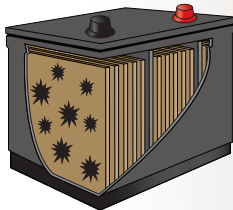
RECHARGED  
E F

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



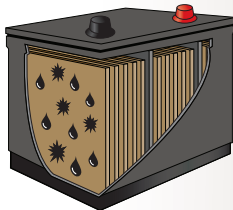
DISCHARGED  
E F

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 ( $V = I * \Omega$ ), 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.

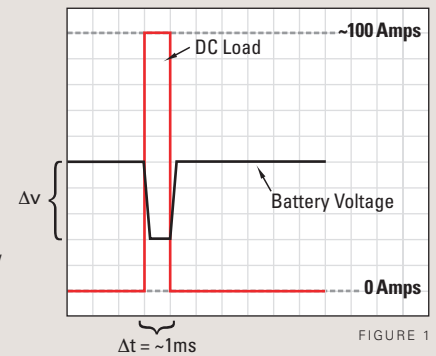


FIGURE 1

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.

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.

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

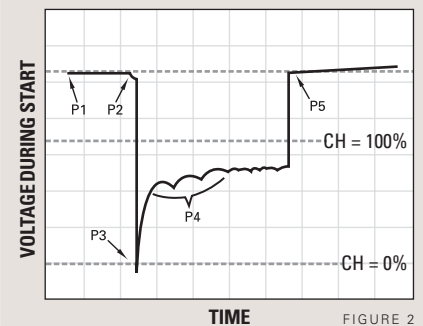


FIGURE 2

## 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.

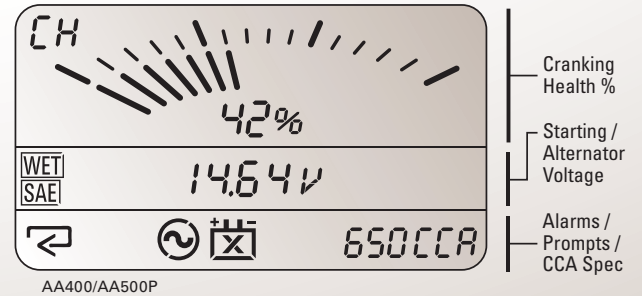
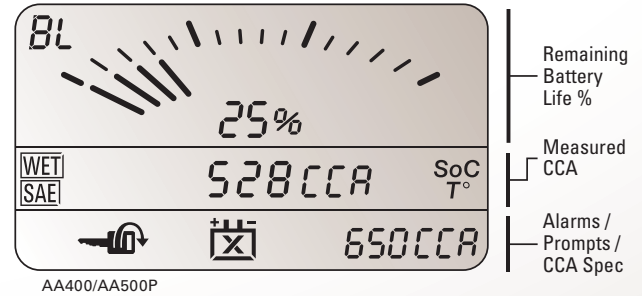
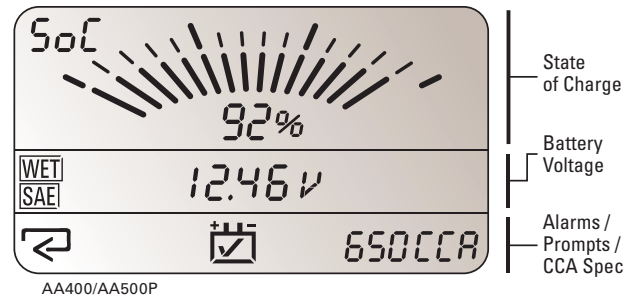
## Logical Displays

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.



### Alarms Legend

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

# ARGUS

**Battery Test Report**  
Date: 2007/1/17 Time: 12:45

Technician:

Battery Model:  
Battery Type: WET  
Battery Standard: SAE  
Reference Value: 650CCA

**1** State of Charge: 92%  
Voltage: 12.46V  
Battery Temperature: 11C/51F

**2** Capacity Test: Warning  
Battery Life: 25%  
Capacity: 528CCA

**3** Cranking Health Test: Warning  
Cranking Health: 42%  
Voltage: 6.91V

**4** Charging System Test: Pass  
Voltage: 14.64V  
Diode Ripple: Pass

**5** Recommendation:  
Replace Now

Tester Model#: AA500P  
SW Version#: v2.3

## 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

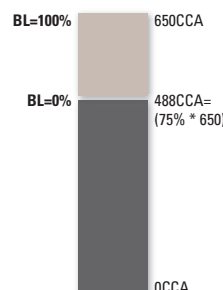
- State of charge
- Battery voltage
- Battery temperature

### 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
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**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