

## TEST PROGRAM: TEST UNDER SPECIFIED LOAD

### Objective:

The aim of this test is to simulate battery performance by running a set of user-defined load until battery reached specified end of discharge voltage. The end of discharge voltage, load and time can be set as required by customers in volts, amperes and minutes. This test is particularly useful to determine the battery performance under stressful heavy load continuously.

### Procedure and Standard:

The battery is fully charged. The next step is to discharge the battery to specified end of discharge voltage by customer. If not specific requirements are provided by customers, MI will help customers to choose the values within battery maximum ratings according to battery datasheet. After discharging, the battery is fully charge again. The total capacity calculated from discharging is assessed to determine the real capacity of battery. The whole testing can be repeated as required. The duration of testing time is listed as below at default charge and discharge rates.

NiCd/NiMH: 2.5-10 Hours  
 SLA: 20-40 Hours  
 Li-ion/LiFePO4: 6-20 Hours

### Equipment:

#### 1. Cadex Analyser - C7x00s and C8000

Voltage: 1.2V - 36V  
 Current: 100mA - 20A  
 Power: 35W - 100W (per station)

#### 2. West Mountain Radio (WMR) CBA Analyser with 500W amplifier

Voltage: 0.9V - 55V  
 Current: 45mA - 160A  
 Power: 500W

#### 3. Vencon UBA

Voltage: 1.2V - 44V  
 Current: 12mA - 3A  
 Power: 45W (per channel)

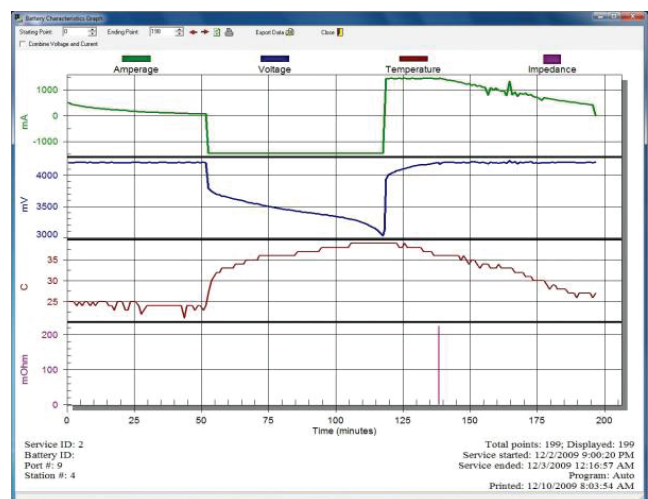
### Results:

The detail display (right) shows battery run-times as well as battery voltage, current and temperature.

In addition, test reports the duration of voltage, battery capacity in AH. The real capacity from testing is shown as percentage of the rated capacity of battery in the report of Cadex Analysers.

See test report samples as below

1. Cadex Test Report
2. CBA Test Report
3. UBA Test Report



## TEST PROGRAM: TEST UNDER SPECIFIED LOAD

### Sample Report 1: CADEX C7

#### **BatteryShop Report** **Master Instruments**

2/1/2016 7:03:16 AM

#### **Battery Information**

Battery ID:	N/A
Battery manufacturer:	BANKSYS ATOS
Battery model:	3032610137
Used in:	Payment Terminals
Customer:	Sample Company

#### **Service Information**

Service ID:	20943
Port/Station number:	10/2 (7450ER/1.1)
Start date:	1/29/2016 7:02:11 AM
End date:	1/29/2016 1:30:18 PM
Duration:	0:6:28:7 [dd:hh:mm:ss]
Charge cycles:	2
Discharge cycles:	1
Recondition cycles:	0
Station program:	Auto
Target capacity:	80%

#### **Battery Status**

Capacity:	94%, 94%
State-of-health:	N/A
OhmTest:	313 mOhms
Test result:	PASS
Fault code:	N/A

#### **Battery Parameters**

Battery chemistry:	LiPh
Nominal voltage:	3.30 Volts
Battery rating:	600 mAh
Charge rate:	360 mA
Discharge rate:	120 mA
Capacity offset:	0%
Temperature sensing:	5C - 45C
Max. charge voltage:	3.60V/Cell
Standby voltage:	3.45V/Cell
End of charge:	0.03C
End of discharge:	2.00V/Cell

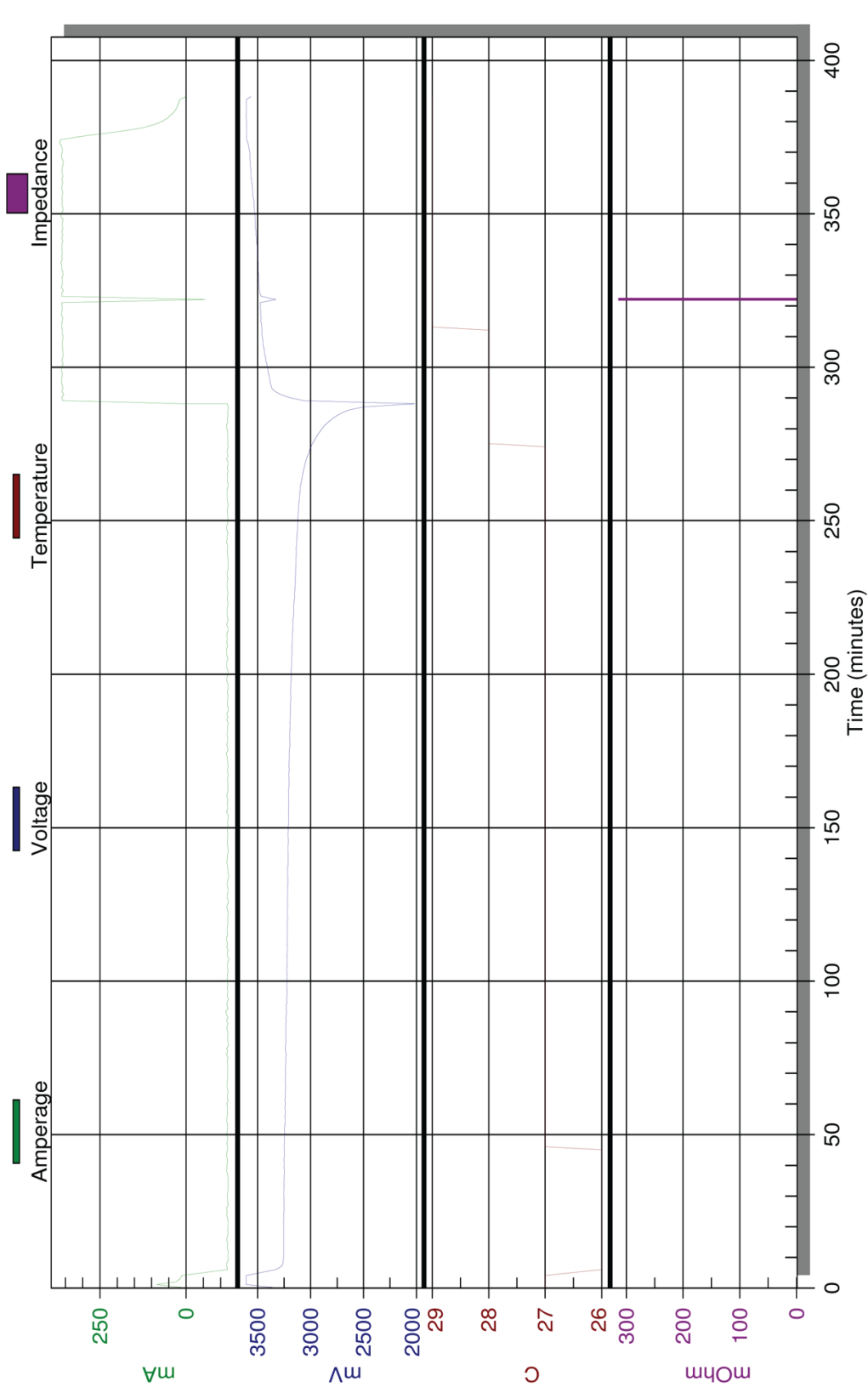
#### **Service Notes**

N/A

BatteryShop Report: 7.1.1.0.8 - C7400ER C-Series/1.1

## TEST PROGRAM: TEST UNDER SPECIFIED LOAD

### Sample Report 1: CADEX C7

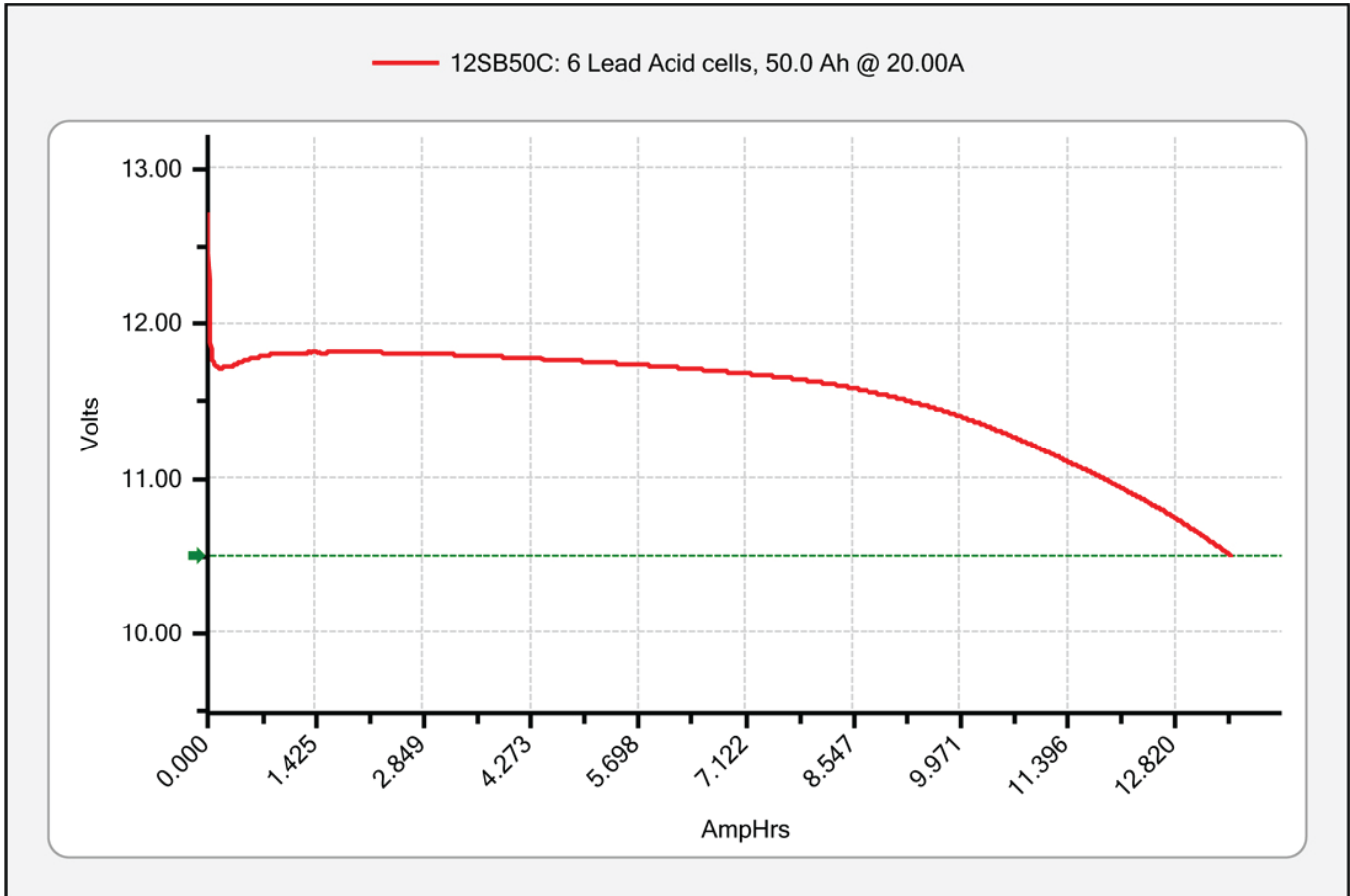


Total points: 390; Displayed: 390  
 Service started: 1/29/2016 7:02:11 AM  
 Service ended: 1/29/2016 1:30:18 PM  
 Program: Auto  
 Printed: 2/1/2016 7:03:32 AM

Service ID: 20943  
 Battery ID:  
 Port #: 10  
 Station #: 2

## TEST PROGRAM: TEST UNDER SPECIFIED LOAD

### Sample Report 2: CBA

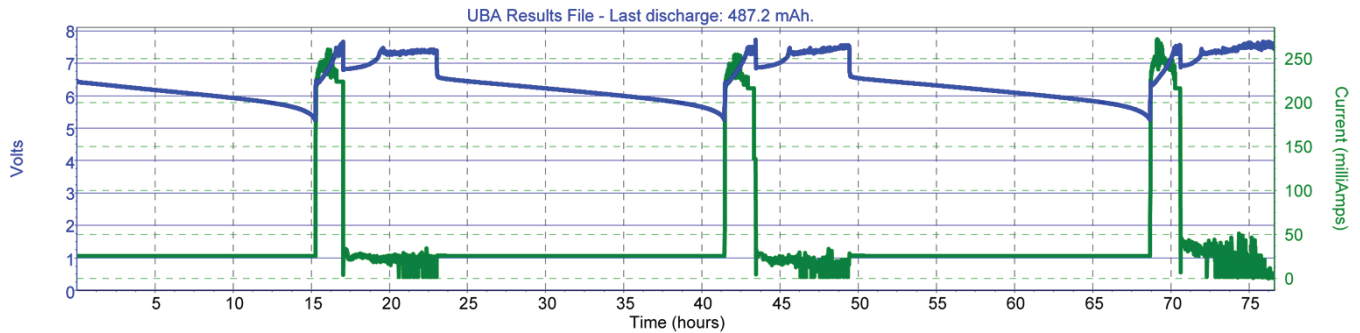


### 12SB50C:

Description: 6 Lead Acid cells, 50.0 Ah @ 20.00A  
 Started At: 27/01/2016 8:16 AM  
 Discharge Rate: 20.00 A  
 Starting Voltage: 12.71 V  
 Ending Voltage: 10.50 V  
 Internal Resistance: 0.05 Ohms  
 Total Time (hh:mm:ss): 00:40:42  
 Tested Capacity: 13.566 Ah

## TEST PROGRAM: TEST UNDER SPECIFIED LOAD

### Sample Report 3: UBA



#### Battery Analysis Results

BAR: S:\USERDATA\Joshy\P\Backup\UBA4\_DATA\SLA 3 Cycle 2.5V Per Cell Charged.bar  
 Filename: D:\Vencon\UBA4\_DATA\6V 500mA SLA PS-605WL New Stock # 14.uba  
 Serial number: 6875 Chan1  
 Number of cells: 3  
 Rated capacity: 500.0 mAh  
 Start time: 2011-10-07 15:54

#### Summary:

Capacity: 386.2mAh (77.2% rated). Fail.  
 Capacity: 466.3mAh (93.3% rated). Pass.  
 Capacity: 487.2mAh (97.4% rated). Pass.

#### SLA Discharge

Duration (h:m:s): 15:15:43  
 Load current: 25.36 mA  
 Cut-off voltage: 1.750 V  
 Battery discharged capacity: 386.2 mAh  
 Exit condition: Battery cut-off voltage reached

#### SLA Fast Charge

Duration (h:m:s): 01:45:48  
 Charge current: 200.0 mA  
 Battery charged capacity: 326.2 mAh  
 Exit condition: Final charge current reached

#### SLA Float Charge

Duration (h:m:s): 06:00:00  
 Charge current: 25.00 mA  
 Battery charged capacity: 137.5 mAh  
 Exit condition: Maximum time reached

#### Goto

Branching

#### SLA Discharge

Duration (h:m:s): 18:24:50  
 Load current: 25.70 mA  
 Cut-off voltage: 1.750 V  
 Battery discharged capacity: 466.3 mAh  
 Exit condition: Battery cut-off voltage reached

#### SLA Fast Charge

Duration (h:m:s): 01:59:19  
 Charge current: 200.0 mA  
 Battery charged capacity: 401.3 mAh  
 Exit condition: Final charge current reached

#### SLA Float Charge

Duration (h:m:s): 06:00:00  
 Charge current: 25.00 mA  
 Battery charged capacity: 117.4 mAh  
 Exit condition: Maximum time reached

#### Goto

Branching

#### SLA Discharge

Duration (h:m:s): 19:14:00  
 Load current: 25.75 mA  
 Cut-off voltage: 1.750 V  
 Battery discharged capacity: 487.2 mAh  
 Exit condition: Battery cut-off voltage reached

#### SLA Fast Charge

Duration (h:m:s): 01:56:36  
 Charge current: 200.0 mA  
 Battery charged capacity: 396.9 mAh  
 Exit condition: Final charge current reached

#### SLA Float Charge

Duration (h:m:s): 06:00:00  
 Charge current: 25.00 mA  
 Battery charged capacity: 167.4 mAh  
 Exit condition: Maximum time reached

#### Goto

Branching

Exit condition: Count 3 iterations