

## **SECTION XXX BATTERY VALIDATION SYSTEM**

### **Part 1 - GENERAL**

#### **1.1 Work Included**

**1.1.1** Extent of Battery Validation System work is indicated by drawings and as specified herein.

**1.1.2** Types of equipment specified in this section include:  
BVS Monitor  
Sensing Harness  
BVM Software

#### **1.2 System Description**

**1.2.1** System shall measure relative impedance of units and interconnects, voltage of units and battery while the battery is on line. The system shall also monitor temperature of the battery and battery room. An alarm contact shall activate upon exceeding preset default values. The system shall sense AC power outages, record and archive total battery and unit voltage decay and optionally current out during discharge. The system shall be able to fully interface with a remote PC for data archiving and trending. The system shall not interfere in any way with the capability of the battery to supply its full load at any time, including during measurement.

#### **1.3 Requirements**

**1.3.1** A Battery Validation System shall be provided for each electrically connected battery string.

### **PART 2 - PRODUCTS**

#### **2.1 Acceptable Manufacturers**

**2.1.1** Manufacturers: Shall be specifically engaged in the manufacture of Battery Validation Systems. Subject to compliance with requirements, provide products of the following: BTECH Inc., Model BVS-S3 or BVS-BC designed specifically for this battery system.

## 2.2 BVS MONITOR

### 2.2.1 Data Presentation

- A. Measurements shall be displayed as they are made. System shall utilize inherent printer to record generated data during an active measure cycle or from archived data.
- B. The BVS shall include provisions for data to be transmitted over a telephone line *or* hard wired short range modem at owners option.

### 2.2.2 Measurement Capability

- A. Voltage
  - a. Total battery voltage: to 600V
  - b. Cell or unit voltage range: 1 to 16 Vdc.
  - c. System, individual cell/unit voltage and optional current out on discharge.
- B. Cell/unit Impedance: 100  $\mu\Omega$  to 10 m $\Omega$ .
- C. Temperature: Ambient and pilot cell
  - a. Preset alarm thresholds, low 32 °F; high 130 °F; battery exceeds ambient by 15 °F
- D. Discharge Events
  - a. Date, time of event to nearest second and duration
- E. Discharge Current Logging (optional)
- F. Internal NiCad Battery Status

### 2.2.3 Connection Capacity

- a. Connections: Up to 257 voltage sense leads; 7 parallel strings

### 2.2.4 Measurement Accuracy

- A. Total Battery Voltage       $\pm 0.1V$
- B. Cell or Unit Voltage       $\pm 0.01V$
- C. Cell or Unit Impedance     $\pm 0.01 \text{ m}\Omega$
- D. Temperature                 $\pm 1 \text{ }^\circ\text{F}$
- E. Relative Humidity
  - a. 10-90% RH, non-condensing

#### **2.2.5 LED Indicators**

- A. Green (1)

"Monitor Normal" - On when:

- a. System functional.

- B. Red (1)

"Alarm" - On when:

- a. System is not functional.
- b. Out-of-limit battery measurement

- C. Yellow (3)

"Voltage Vdc" - On when measuring or displaying:

- a. Battery Voltage

"Resistance m-ohm" - On when measuring or displaying:

- a. Battery Resistance

"Temperature deg. F" - On when measuring or displaying:

- a. Battery temperature

- b. Ambient temperature

#### **2.2.6 Digital Metering**

- A. Three, 0.3 inch high red LED digits shall be provided, indicating the cell or unit being tested.
- B. Four, 0.5 inch high red LED digits displaying;
  - a. Measurement just made
  - b. Limits in use
  - c. New limits as programmed
  - d. Test interval or first test time

#### **2.2.7 Power Requirements**

- A. The system power supply transformer shall be Class II double insulated and shall be supplied 120 Vac, 60 Hz at 20 watts from the same distribution source as the primary to the UPS system or battery charger circuit.
- B. The system shall include a monitored internal NiCad battery, permitting 2 hour operation of the BVS during loss of AC power input.

#### **2.2.8 Enclosure**

- A. The BVS-S3 monitor shall be provided in a NEMA 1 type enclosure suitable for wall mounting. Dimensions shall not exceed: 24"W x 24" H x 8" Dp.

### **2.3 Sensing Harness**

- 2.3.1** A system sensing harness with fused and numbered leads, shall be custom fabricated by the manufacturer of the system to facilitate interconnection between monitor and battery. Harness leads shall be fused.

## **2.4 Battery Validation Manager (BVM) Software**

- 2.4.1** BVM Software: Shall be a Y2K compliant “Windows” based software package to operate on a 486 or better PC running “Windows” 3.1 NT or 95,4 MB RAM. The software shall communicate with the BVS via telephone or dedicated 2 twisted pair lines to acquire and archive the measured data, recall and sort it, print and/or plot it, and facilitate the observance of trends in the data which signify deteriorating conditions, allowing remedy before actual failure occurs. The software shall also provide the capability of remotely changing preset alarm thresholds. The system shall utilize a password which must be entered prior to making programming changes. The password rule is applicable when interfacing with the monitor keypad or remotely via a PC keyboard.
- 2.4.2** The BVM Software shall be capable of managing multiple battery monitoring systems and be able to auto poll each system on a programmed schedule.

## **PART 3 - EXECUTION**

### **3.1 Installation**

- 3.1.1** The BVS monitor shall be installed in accordance with manufacturers instructions. The proper installation of the system is critical to proper performance, The installer shall meet with the manufacturer or an authorized manufacturers representative at the site prior to ordering installation material. The site review shall include the installer, the manufacturer, and the battery plant owner to ensure proper co-ordination . Routing of sense lead lengths are to determined at the initial site visit by agreement of the parties.
- 3.1.2** Connect sensing harness as provided by the system manufacturer to each unit of the UPS battery. In case of multiple cell jars, connection at the jar level is the preferred method. Harness to be protected and trained in Panduit, Iboco or equivalent wire trays mounted on wall above the battery or within the battery rack as defined by the manufacturers installation instructions. In general, the sense leads must be run separate from any power wiring. Incorrect location/routing of the sense leads will cause errant readings.

## **3.2 On-Site Testing and Training**

**3.2.1** A factory service technician shall be provided to supervise connections and assist in establishing and setting default limits. The factory service technician shall also provide a 2 hour BVS product training session to responsible facility personnel.