

Arshanold Battery Data Acquisition Module

1 Introduction

Arshanold modules have been widely utilized for battery testing. Unlike other rack mount or card data acquisition systems which require wiring from each battery to distant rack or computer, the compact Arshanold TM module (UL 94-V0 flame retardant housing) can be installed next to battery module, rack or cabinet. The 3rd generation technology has powered the module for the challenging applications, such as high common voltage, large number of cells, different battery types etc. All excellent performances come in a rigid, 2/3 book size compact module.

Excel sheet software allows engineers and researchers to plug & play. Compatible with our Battery Analyzer software, a large testing system can be flexibly constructed with TM module(s), sensor(s) and communication parts for up to several thousands batteries per system.

2 Features

- +/-20V for each channel with +/-400V protection at any battery input terminal
- Up to 400VDC (600V for TM-40HV high voltage version) super wide voltage range for whole string
- 16-bit high resolution data acquisition
- No mechanical scanning relays, high reliability for industrial application
- High noise immunity for high ripple application
- System-on-board design, no need for other controller
- Industry standard communication: Modbus/RTU.
- ESD protected RS-232C and RS-485 interface
- Dual-color LEDs for each channel for scanning and battery alarm indication
- Easy DIN-rail or wall mount installation



3 TM Modules

Product Number	Differential Channel (2-wire mode)	Single Ended Channel (1-wire mode)
TM-30 Universal DAQ Module	30 batteries	59 batteries
TM-40HV DAQ Module	20 batteries	40 batteries

4 Applications

- Electric Vehicle Battery System Development
- Electric Vehicle Road Test
- UPS (Uninterruptible Power Supply, 10 to 500kW) Load Test
- Solar Hybrid Power System Evaluation
- Battery Development & Test Lab
- Battery Manufacture Formation and Test
- **Other systems which may have many batteries ...**

**Easy
Safe
Accurate**

Battery Type: Valve Regulated Lead Acid, Flood Lead Acid, Ni-Cad, Ni-MH, Li-ion and LiFePO4.

5 Specifications

5.1 Simple Power Supply

Voltage	+12VDC (Igniter, Universal AC or DC adapter available)
Maximum Power Consumption	< 3W per module
Isolation	500VDC@1min 1,000VDC@1min for high voltage version

5.2 Current Input

Current Sensor	Close loop sensor is suggested for high accuracy. Split core sensor available. LEM sensor or compatible transducers. (+/-12V power supply)
Current channel	2 channels (for 2 sensors)
Resolution	0.1A at the range of 3,000A 0.01A at the range of 300A
Accuracy	0.1% + sensor accuracy

5.3 Temperature Measurement

Sensor	Digital high precision
Range	-20 to 80°C
Accuracy	1 °C

5.4 Battery Voltage Channel

Valid Input Range	+/- 20V
Protected input	+/- 400V at any voltage input terminal
Resolution	1mV
Scanning Speed	0.1 Second per channel (This product is not designed for ultra high speed acquisition.)
Accuracy	0.1%
Input Wiring	2-wire for differential input 1-wire for single ended input

5.5 String Voltage

Measurement	1 separate channel for string voltage
Range	0 to 400V (0 to 600V for TM-40HV)
Accuracy	0.1%

5.6 Communication

Serial Port	Isolated RS-232C and RS-485 interface 2 ports can be linked simultaneously.
Isolation protection	500VDC to battery
Protocol	MODBUS RTU Protocol available for integration to LabVIEW or other customer software.
Connection Mode	Mode 1: One-to-One. 1 port to 1 module through RS-232 Mode 2: All modules link through RS-485
Transmission speed	Default 9600 (14400/19200/28800/57600 selectable)
Maximum capacity per system	1 to 30 modules for MODBUS system
Network adapter (optional)	Serial to Ethernet adapter, RJ45, 10/100M

5.7 LED Indication and Alarm Output

- Dual-color LEDs for each channel
- Green LEDs indicate dynamic scanning
- Red LEDs indicate battery condition alarm.
- Alarm output. (DIN-rail relay optional)
- Programmable alarm condition:
 - Battery Voltage High or Low
 - String Voltage High or Low
 - Charge Current High
 - Discharge Current High
 - Temperature High

6 Software and Database

- A. *Excel Based Data Log Software*
- B. *Battery Analyzer Software with SQL Server (Windows 32/64 bit)*
- C. *NI LabVIEW Modbus Compatible*

7 Order online: www.batterydaq.com/shop

References

1. USCAR (UNITED STATES COUNCIL FOR AUTOMOTIVE RESEARCH) website: Electric Vehicle Battery Test Procedures Manual
http://www.uscar.org/guest/article_view.php?articles_id=74
2. IEEE Std 1188 (1996) IEEE Recommended Practice for Maintenance, Testing, and Replacement of Valve-Regulated Lead-Acid(VRLA) Batteries for Stationary Applications
3. IEEE Std 1491 (2005) IEEE Guide for Selection and Use of Battery Monitoring Equipment in Stationary Application
4. IEC 62133 Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications

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