BVS Series

Battery Voltage Supervisor

- Efficient analyzer for battery discharge testing
- Automated string and cell voltage, inter-cell connection voltage, string current and ambient

  temperature measurements during capacity tests
- Detection and notification of

  failing cells
- Reliable and easy to operate
- Detailed test analysis and reporting provided using DV-B Win software



Description

Battery Voltage Supervisor (BVS) is a battery monitoring system for real-time data gathering and viewing.
The BVS main role is monitoring battery voltage values during a battery discharge testing in order to meet IEC, IEEE and NERC requirements.
The BVS is an integrated system consisting of:

- BVS Control Unit (BVS-CU)
- Cell Voltage Modules (CVM)
- String voltage module (SVM) (optional)
- String current module (SCM) (optional)

The BVS-CU performs monitoring and measurements data acquisition from the CVM modules and their transfer to a PC. In addition, the BVS-CU provides power supply to all connected CVM modules.
The cell voltage modules are installed on the individual batteries (cells), performing battery voltage and inter-cell voltage measurements.
The BVS system acts as an add-on to the Battery Load Unit (BLU) series of devices while performing a battery discharge test, providing detailed analysis of an individual cell's condition. The BVS system identifies a potential battery malfunction by monitoring the following cell parameters from an array of the cell voltage modules CVM:

- Cell voltage
- Inter-cell connection voltage

In addition, the BVS-CU provides ambient temperature measurements on multiple locations (4 temperature channels). Overall string voltage and string current measurements can be achieved by using optional string voltage module (SVM) and string current module (SCM).

The CVM modules detect cells that fail a discharge test based on measured voltage values, so these cells can be safely removed from the battery string.
Data acquisition and extensive analysis capabilities of data collected from the CVM are available in the DV–B Win application software suite, providing a user data viewing, tracking and generation of comprehensive reports.

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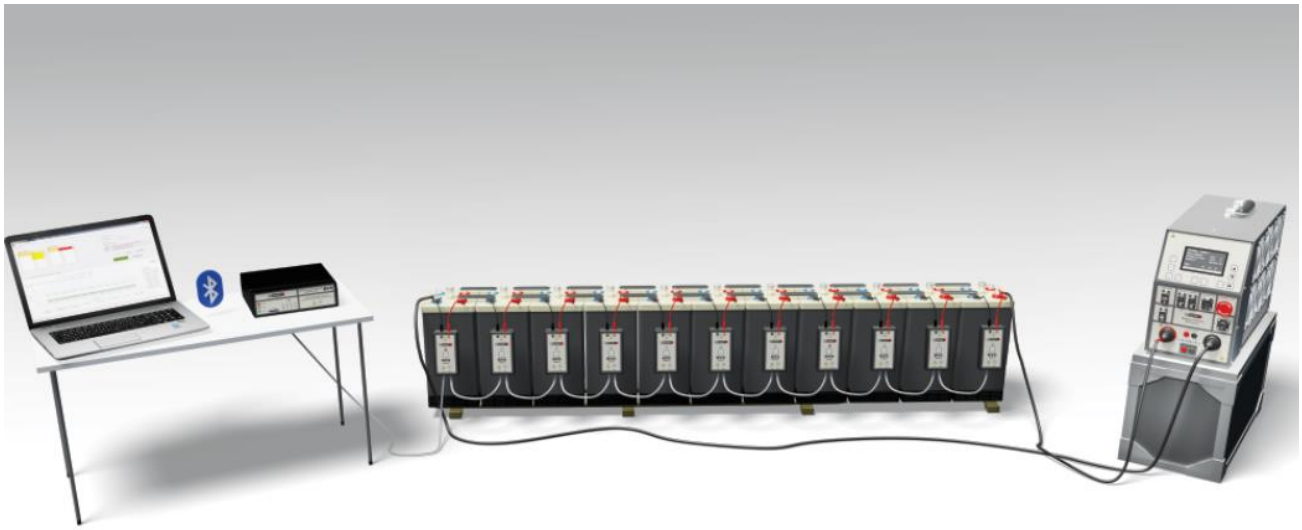
Applications

The list of the instrument applications includes:

- Real time cell condition assessment by monitoring and recording cell and inter-cell voltages from the set of the CVM modules during a battery capacity (discharge) testing as well as charging procedure.
- Real time ambient temperature monitoring with the BVS-CU unit
- String voltage and current monitoring using additional string voltage module (SVM) and string current module (SCM)
- Internal resistance calculation according to **IEC 60896-21**, in combination with Battery Load Unit (**BLU)** instruments
- Detailed data trending and analysis provided using DV-B Win software

BVS Connection Diagram

In the BVS system implementation, every CVM module is installed directly on an individual cell. Failure of one of the CVM modules will not affect communication between the rests of operating CVM modules and the BVS-CU. The connection diagram of the BVS to a battery string is presented in the figure below.



Connection diagram of BVS system components in combination with Battery Load Unit device

Features and Benefits

Extensive cell analysis during discharge test

Using the BVS as a supplement to the Battery Load Unit (BLU) devices provides multiple advantages during a battery discharge testing.
The CVM modules measure voltage values in real-time mode and forward recorded data to the Control Unit in user defined intervals selected through DV-B Win application software.
All out-of-tolerance measurement values are announced by a LED signalization on an individual CVM module, so the failing cells can be detected before endangering the entire battery system. This enables detecting and safely bypassing the failing cell during a discharge process.
Up to 4 ambient temperature measurement channels are provided on the BCM-CU for measuring ambient temperature on multiple locations. Additional two modules can used in case string voltage and current measurements are required. Using these two optional modules enables the BVS system to work in conjunction with any load bank on the market and perform completely automated capacity tests.

Battery Internal Resistance Measurement

The battery internal resistance calculation is an additional BVS feature available in combination with the BLU instruments. The test method used for internal resistance calculation complies with battery test methods recommended by **IEC 60896-21** standard.

DV-B Win Software

All results transferred from the BVS system can be viewed, analyzed and presented in selectable report forms by using the DV-B Win software application.
Data can be transferred to a PC through a USB or Bluetooth communication.
Both, the BVS and the BLU device provided results can be viewed on the same report form.
A quick pass/fail test for a cell internal resistance values may be performed based on a user defined thresholds, adding additional insight in an individual cell's status.

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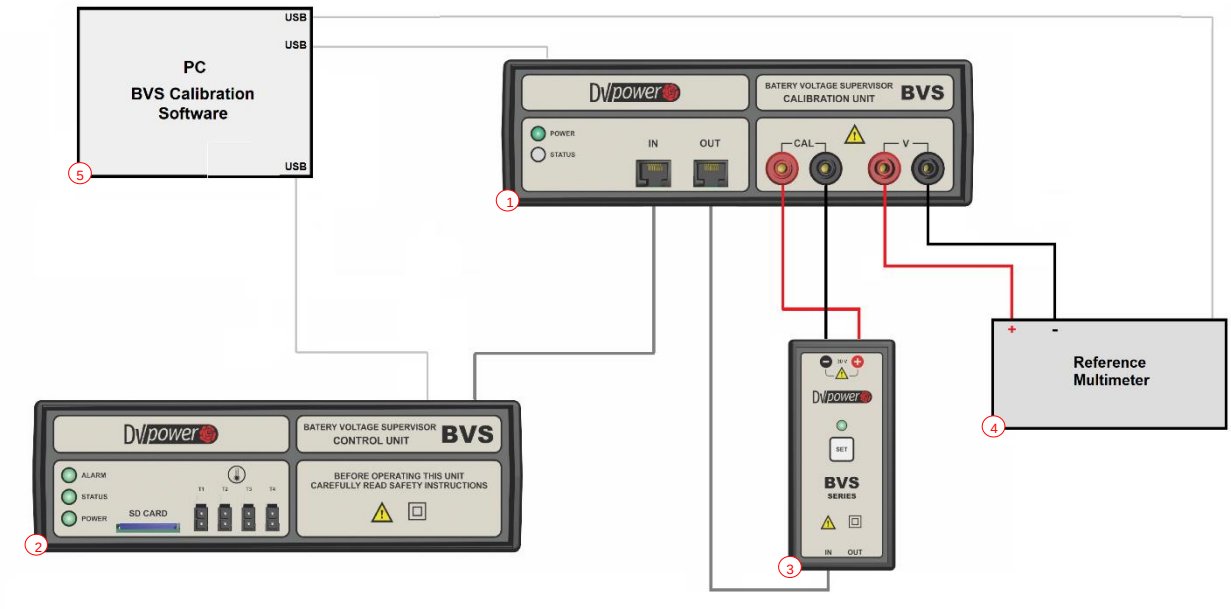
BVS Calibration Unit

To simplify the calibration process of the entire BVS system, a special BVS Calibration Unit is provided as an optional accessory. This unit, in combination with BVS CU and a reference multimeter, provides a quick and reliable calibration process for CVM, performed in only a few minutes.



BVS Calibration Unit

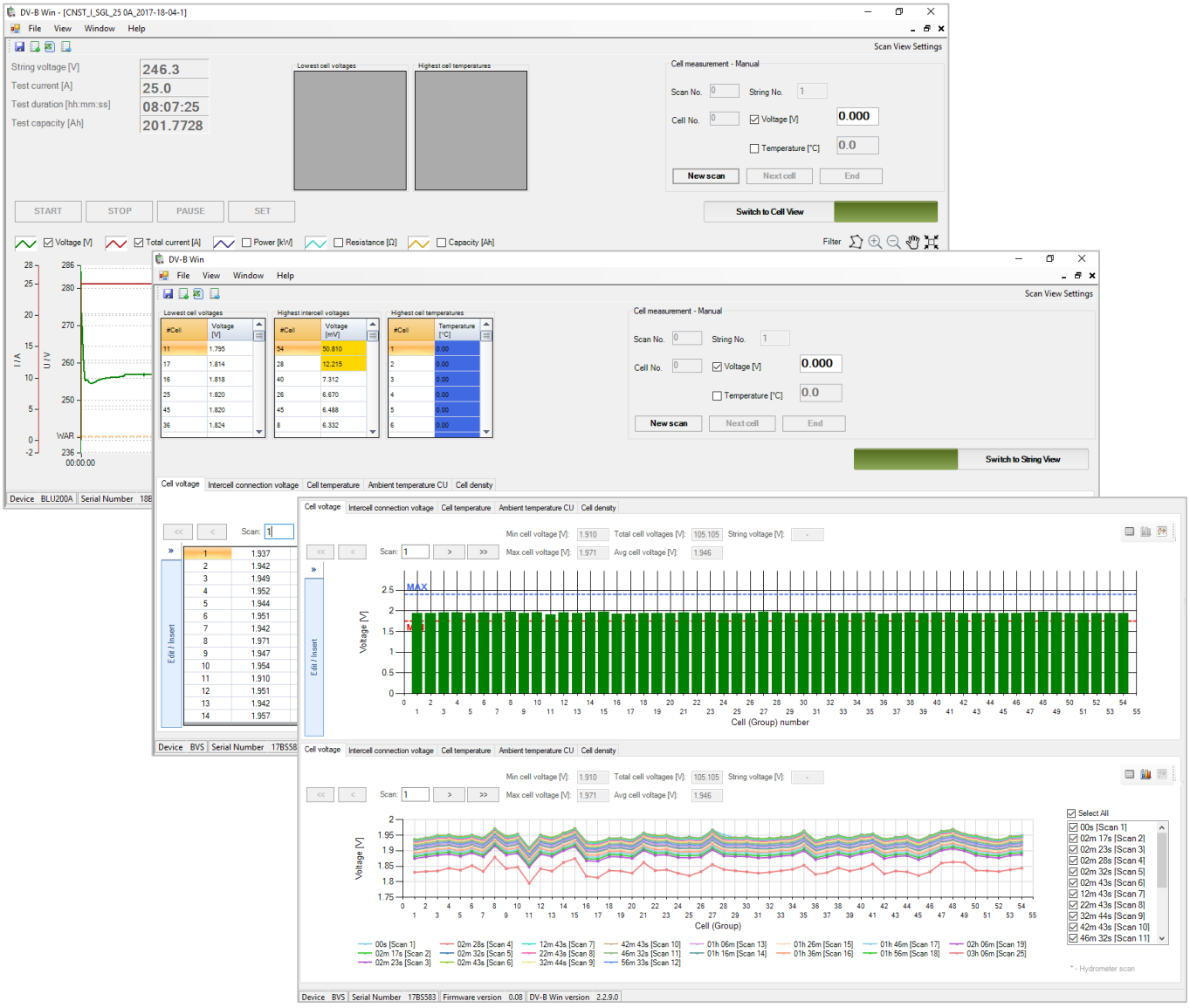
- Quick calibration of both V and mV measurement channels and verification of individual CVMs
- Precise voltage generation provided by BVS Calibration unit
- Fast and reliable detection of any operating error on CVM
- Automated CVM Calibration system and Troubleshooting provided by BVS Calibration software
- Automated Troubleshooting mode for inspection of BVS Calibration Unit
- Calibration results and CVM status reports generated by BVS Calibration software



Connection diagram for BVS Calibration:
1 –BVS Calibration Unit, 2 – BVS Control Unit, 3 – Calibrated CVM
4 – Reference multimeter, 5 – Connection to PC for BVS Calibration software

DV-B Win Main Features

- Full control of BVS system from PC
- Both discharge results from BLU device and cell voltage values from CVM can be previewed in one DV-B Win file
- Acquisition and detailed analysis of measured data
- String voltage, cell voltage, inter-cell voltage and internal resistance trending
- Test report for BLU and BVS are available in several formats (Excel spreadsheet, pdf, word or RTF)
- User selected sampling time of CVM



DV-B Win features: String View (BLU) & Cell View (BVS) functions

Technical Data

Mains Power Supply

- Input voltage: 90 – 264 V AC, 50/60 Hz
- Input power: 110 VA
- CVM supply voltage: 66 V DC

Measurement

Parameters	Measuring range	Resolution
Cell voltage	± 30 V	1 mV
Intercell connection voltage	± 50 mV	1 µV
String voltage	± 600 V	1 mV
String current	± 1 V	0,1 µV

- Typical accuracy:

±50 mV DC: ± (1% rdg + 1% F.S)

±1 V DC: ± (0,1% rdg + 0,1% F.S)

±30 V DC: ± (0, 1% rdg + 0, 1% F.S)

± 600 V DC ± (0, 1% rdg + 0, 1% F.S)

- Temperature:

  - 20 °C - +80 °C / -4 °F - +176 °F

BVS-CU and CVM communication

- RS485 serial communication

Communication with PC

- USB
- Bluetooth

Memory

- Internal SD Card: 2 GB SD

Environment conditions

- Temperature:

  -40 °C to +85 °C /-40 °F to +185 °F

- Maximum relative humidity:

  95 % for temperatures up to 31 °C/88 F, decreasing

  linearly to 40 % relative humidity at 55 °C/131 F

Dimensions and Weight

- Dimensions (L x W x D):

  BVS-CU: 206 mm x 180 mm x 64 mm

  8.11 In x 7.08 in 2.51 in

  CVM: 66 mm x 28 mm x 139 mm

  2.6 In x 1.1 in x 5.5 in

  SVM: 66 mm x 28 mm x 139 mm

  2.6 In x 1.1 in x 5.5 in

  SCM: 66 mm x 28 mm x 139 mm

  2.6 In x 1.1 in x 5.5 in

- Weight:

  BVS-CU: 0, 78 kg / 1.7 lbs.

  CVM: 0, 14 kg / 0.3 lbs.

  SVM: 0, 18 kg / 0.4 lbs.

  SCM: 0, 18 kg / 0.4 lbs.

Warranty

- Transport case is considered as the standard accessory for the BVS system. Ordering the BVS with the transport case provides three years manufacturer's warranty. Avoiding including it in a purchase order will provide 15 month warranty

Applicable Standards

- Pollution degree: 2
- Insulation category: I
- Safety: EN 61010-1, LVD 2014/35/EU

  IEC 61010-1 (international standard),

  UL 61010-1

CAN/CSA-C22.2 No. 61010-1, 2nd edition,

including Amendment 1

Electromagnetic Compatibility (EMC)

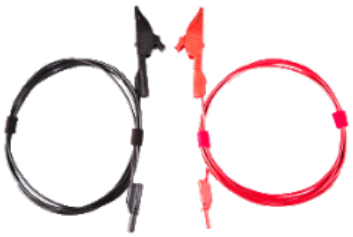
- CE conformity: EMC standard EN 61326-1

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EMC directive 2014/30/EU

All specifications herein are valid at cell temperature of + 25 °C and recommended accessories.
Specifications are subject to change without notice.
Specifications are valid if the instrument is used with the recommended set of accessories.

Accessories



Measurement cables with fuse protection for CVM



Communication cables for CVM



Current clamps 30/300 A with internal battery supply for SCM



BVS Calibration Unit

Ordering Info

Instrument	Article No
Battery Voltage Supervisor Control Unit	BVS-CUNN-000

Included accessories	Article No
Mains power cable, DV-B Win software including USB cable	
Cell Voltage modules CVM*	(BVS-CVMCN-00)

Recommended accessories	Article No
Voltage sense cables 2 x 0,25 m 1mm^2 with banana plugs + alligator clips**	S-025-01BPAC
Communication cable for CVM connection 1 x 0,25 m**	C1-0025-RJRJ
Communication cable for CVM connection 1 x 2 m	C1-2000-RJRJ
Temperature sensor for ambient temperature measurement 1,5 m***	TP-2015-NTC0
Plastic transport case	PLST-CAS-BV1
Plastic transport case	PLST-CAS-BV2

Optional accessories	Article No
String Voltage module	BVS-SVM00-00
String Current module	BVS-SCM00-00
Bluetooth communication module	BLUET-MOD-00
Voltage sense cables 2 x 0,5 m 1mm^2 with banana plugs + alligator	S-005-01BPAC

clips	
Voltage sense cables 2 x 0,25 m 1mm^2 with banana plugs + dolphin clips	S-025-01BPDC
Voltage sense cables 2 x 0,5 m 1mm^2 with banana plugs + dolphin clips	S-005-01BPDC
Voltage sense cables 2 x 0,25 m 1mm^2 with banana plugs	S-025-01BPBP
Voltage sense cables 2 x 0,5 m 1mm^2 with banana plugs	S-005-01BPBP
Sense cables 2 x 5 m with banana plugs + dolphin clip	S2-05-00BPDC
Current clamps 30/300 A with internal battery supply and extension cable 5 m	CACL-0300-08
Cable bag	CABLE-BAG-00
Rechargeable NiMH battery 8,4 V 300 mAh for current clamps	RCGB-30084-0
Battery charger 2 x 9 V for NiMH/NiCd batteries	BATCH-2X9V-0
BVS Calibration Unit	BVS-CALSYC-0

** Number of CVM may vary depending on application*

*** Different cable lengths available upon request*

****Different types of temperature sensors available upon request*

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IBEKO Power AB
Stockholmsvägen 18
181 50 Lidingö, Sweden

Contact
Phone: +46 70 0925 000
E-mail: sales@dv-power.com