BVS-4 Series

Battery Voltage Supervisor

- Efficient analyzer for battery discharge testing

- Supervision of up to 4 battery cells per CVM-4 module

- Automated string and cell voltage, string current and ambient temperature and cell 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

- Cell temperature measurement of one cell per module

Automated string and cell

Description

The Battery Voltage Supervisor (BVS-4) is a battery monitoring system for real-time data gathering and viewing.
The BVS-4 main role is monitoring battery voltage values during a battery discharge testing in order to meet IEC, IEEE and NERC requirements.
The BVS-4 is an integrated system consisting of:

- BVS Control Unit (BVS-CU)
- Cell Voltage Modules for 4 cells (CVM-4)
- String voltage module (SVM) (optional)
- String current module (SCM) (optional)

The BVS-CU performs monitoring and measurements data acquisition from the CVM-4 modules and their transfer to a PC. In addition, the BVS-CU provides power supply to all connected CVM-4 modules.
Each CVM-4 can monitor 4 cells, and perform battery voltage measurements.
The BVS CM 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-4 system identifies a potential battery malfunction by monitoring the following cell voltage parameters from an array of the cell voltage modules CVM-4. In case of using BVS-4 model with BLU-C series devices, there is no need for BVS-CU. BVS-CU is incorporated in BLU-C series devices, and connection is simplified by only connecting first CVM-4 module to BLU-C series device.

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-4 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-4 are available in the DV–B Win application software

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suite, providing a user data viewing, tracking and generation of comprehensive reports.

In addition, measurement of cell temperature for one cell per module is provided as an option and available on request

Applications

The list of the instrument applications includes:

- Real time cell condition assessment by monitoring and recording cell voltages from the set of the CVM-4 modules during a battery capacity (discharge) testing as well as charging procedure.

- Real time ambient temperature monitoring with the BVS-CU unit

- Cell temperature measurement of one cell per module

- String voltage and current monitoring using additional string voltage module (SVM) and string current module (SCM)

- In combination with the Battery Load Unit (**BLU)** instruments:

  - Enables internal resistance estimation according to **IEC60896-21**

- Detailed data trending and analysis provided using DV-B Win software

BVS CM-4 Connection Diagram

In the BVS system implementation, every CVM-4 module is installed to monitor up to 4 cells. Failure of one of the CVM-4 modules will not affect communication between the rests of

operating CVM-4 modules and the BVS-CU. The connection diagram of the BVS-4 to a battery string is presented in the figure below.
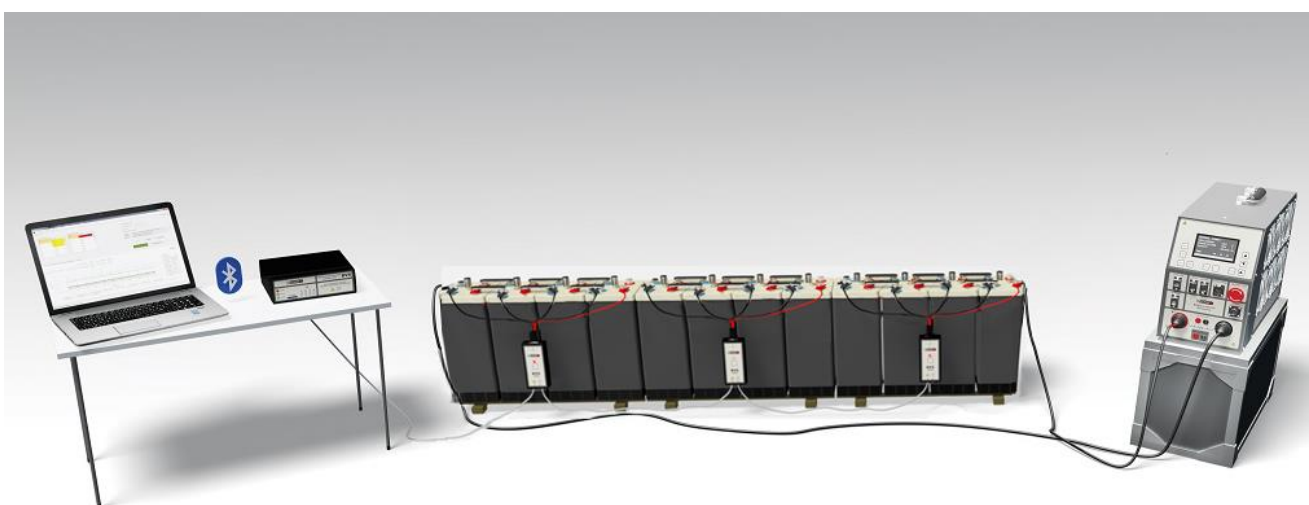
Connection diagram of BVS-4 system components in combination with Battery Load Unit device

Features and Benefits

Extensive cell analysis during discharge test

Using the BVS-4 as a supplement to the Battery Load Unit (BLU) devices provides multiple advantages during a battery discharge testing.

The CVM-4 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-4 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. If any cell voltage drops below defined minimum cell voltage, test is automatically paused, and after replacement of the malfunctioned cell, test can be continued manually.

Up to 4 ambient temperature measurement channels are provided on the BVS-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-4 system to work in conjunction with any load bank on the market and perform completely automated capacity test.

Battery Internal Resistance Measurement

The battery internal resistance calculation is an additional BVS-4 feature available in combination with the BLU instruments. The test method used for internal resistance estimation complies with battery test methods recommended by the **IEC60896-21** standard.

DV-B Win Software

All results transferred from the BVS-4 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 USB or Bluetooth communication.

Both, the BVS-4 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.

DV-B Win Main Features

- Full control of the BVS-4 from a PC or a BLU-C unit

- Both discharge results from BLU device and cell voltage values from CVM-4 can be previewed in one DV-B Win file

- Acquisition and detailed analysis of measured data

- String voltage, Cell voltage and internal resistance trending

- Test report for BLU and BVS-4 are available in several formats (Excel spreadsheet, pdf, word or RTF)

- User selected sampling time of CVM-4
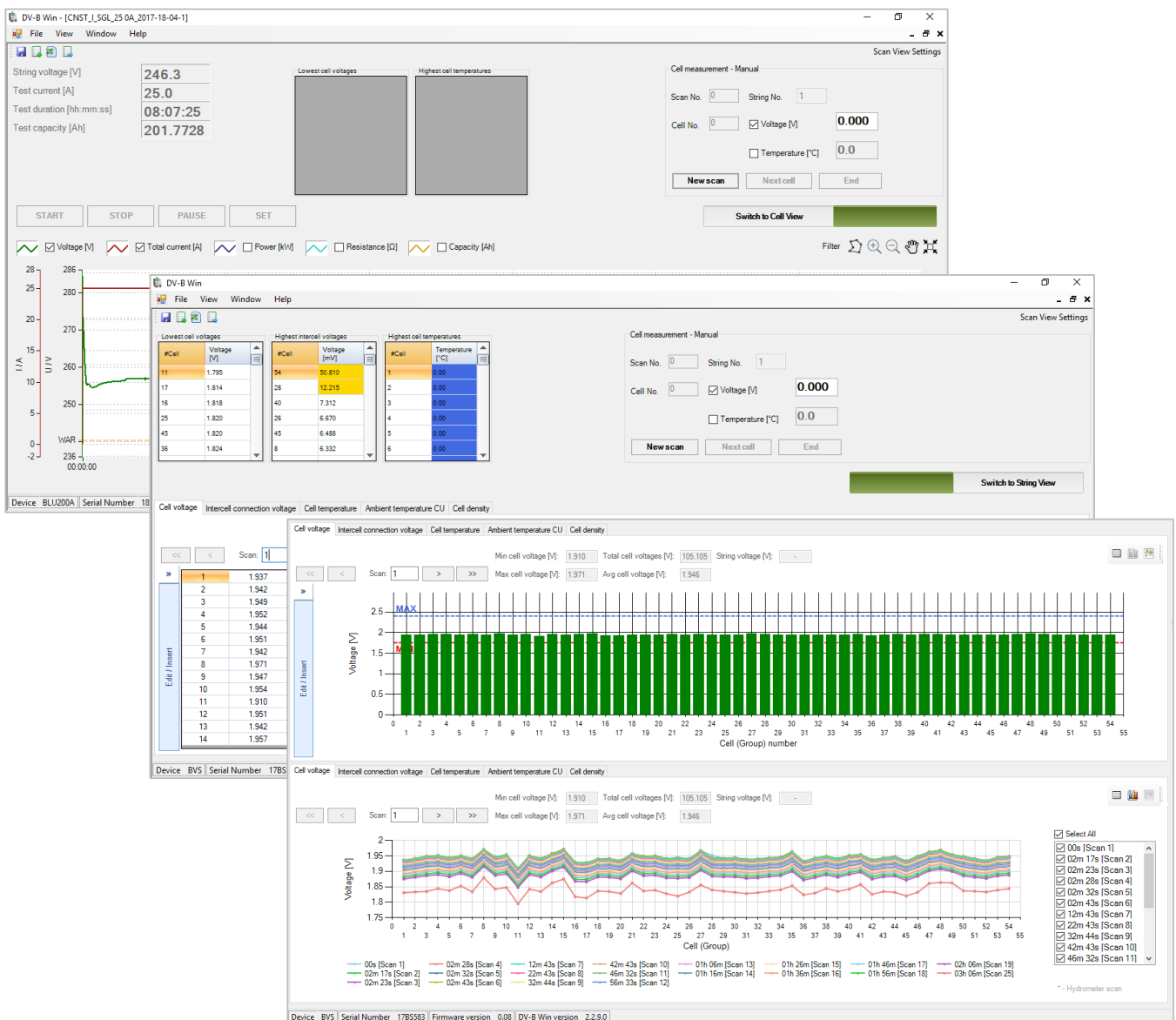
DV-B Win features: String View (BLU) & Cell View (BVS-4) functions

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 DC	1 mV
String Voltage	± 600 V	1 mV
String Current	± 1 V	0,1 µV

- Typical accuracy:

±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-4 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-4: 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-4: 0, 14 kg / 0.3 lbs.

  SVM: 0, 18 kg / 0.4 lbs.

  SCM: 0, 18 kg / 0.4 lbs.

Warranty

- 3 years

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 61326-1:2013
  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.

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,	

Recommended accessories	Article No
Cell Voltage module CVM-4*	BVS-CVM4N-00
Voltage sense cable set 2 x 0,75 m and 3 x 0,5 m for CVM-4 with banana plugs +dolphin clips **	S230-00NN-DC
Communication cable for CVM connection 1 x 0,75 m**	C1-0075-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
Cable bag	CABLE-BAG-00
Plastic transport case for BVS Control Unit and CVM	PLST-CAS-BV1

Optional accessories	Article No
String Voltage module	BVS-SVM00-00
String Current module	BVS-SCM00-00
Voltage sense cable set 2 x 1 m, 2 x 0,75 m and 1 x 0,5 m for CVM-4 with banana plugs + alligator clips	S221-00NN-AC
Voltage sense cable set 2 x 1 m, 2 x 0,75 m and 1 x 0,5 m for CVM-4 with banana plugs + dolphin clips	S221-00NN-DC
Voltage sense cable set 2 x 1 m, 2 x 0,75 m and 1 x 0,5 m for CVM-4 with temperature sensor and banana plugs + dolphin clips	S221-00TS-DC
Voltage sense cable set 2 x 1 m, 2 x 0,75 m and 1 x 0,5 m for CVM-4 with temperature sensor and banana plugs + alligator clips	S221-00TS-AC
Voltage sense cable set 2 x 0,75 m and 3 x 0,5 m for CVM-4 with banana plugs + alligator clips	S230-00NN-AC
Voltage sense cable set 2 x 0,75 m and 3 x 0,5 m for CVM-4 with temperature sensor and banana plugs + alligator clips	S230-00TS-AC
Voltage sense cable set 2 x 0,75 m and 3 x 0,5 m for CVM-4 with temperature sensor and banana plugs + dolphin clips	S230-00TS-DC
Communication cable for CVM connection 1 x 1 m	C1-1000-RJRJ
Communication cable for CVM connection 1 x 0,25 m	C1-0025-RJRJ
Communication cable for CVM connection 1 x 0,5 m	C1-0005-RJRJ
Sense cables 2 x 5 m with banana plugs + dolphin clip	S2-05-00BPDC
Current clamp 30/300 A with internal battery supply and extension 5 m	CACL-0300-08
Plastic transport case for CVM	PLST-CAS-BV2
Cable plastic case - small size	CABLE-CAS-01
Cable plastic case - medium size	CABLE-CAS-02
Cable plastic case – large size	CABLE-CAS-03
Alligator clip (red)	ALIG-CLP-R00
Alligator clip (black)	ALIG-CLP-B00
Dolphin clip (red)	DOLP-CLP-R00
Dolphin clip (black)	DOLP-CLP-B00

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

* Number of CVM may vary depending on application

** Different cable lengths available upon request

***Different types of temperature sensors available upon request

Order Examples:

BVS-4 for 24 cells supervision:

Instrument with Included Accessories	Quantity	Article No
Battery Voltage Supervisor Control Unit		BVS-CUNN-000
- Mains power cable		
- USB with DV-B Win PC software	1 set	
- USB cable		
Recommended Accessories		
Cell Voltage module CVM-4	6 pcs	BVS-CVM4N-00
Voltage sense cable set 2 x 0,75 m and 3 x 0,5 m for CVM-4 with banana plugs +dolphin clips	6 set	S230-00NN-DC
Communication cable for CVM connection 1 x 0,75 m	5 pcs	C1-0075-RJRJ
Communication cable for CVM connection 1 x 2 m	1 pc	C1-2000-RJRJ
Temperature sensor with cable 1,5 m for temperature measurement	1 pc	TP-2015-NTC0
Cable bag	1 pc	CABLE-BAG-00
Plastic transport case for BVS Control Unit and CVM	1 pc	PLST-CAS-BV1

BVS-4 for 120 cells supervision:

Instrument with Included Accessories	Quantity	Article No
Battery Voltage Supervisor Control Unit		BVS-CUNN-000
- Mains power cable		
- USB with DV-B Win PC software	1 set	
- USB cable		
Recommended Accessories		
Cell Voltage module CVM-4	30 pcs	BVS-CVM4N-00
Voltage sense cable set 2 x 0,75 m and 3 x 0,5 m for CVM-4 with banana plugs +dolphin clips	30 set	S230-00NN-DC
Communication cable for CVM connection 1 x 0,75 m	29 pcs	C1-0075-RJRJ
Communication cable for CVM connection 1 x 2 m	1 pc	C1-2000-RJRJ
Temperature sensor with cable 1,5 m for temperature measurement	1 pc	TP-2015-NTC0
Cable plastic case - medium size	1 pc	CABLE-CAS-02
Plastic transport case for BVS Control Unit and CVM	1 pc	PLST-CAS-BV1
Plastic transport case for CVM	2 pc	PLST-CAS-BV2

IBEKO Power AB

Stockholmsvägen 18

181 50 Lidingö, Sweden

Contact

Phone: +46 70 0925 000

E-mail: sales@dv-power.com