# BVM
## Battery Voltage Monitoring

Megger


- **Enables automatic battery cell voltage measurements during capacity tests**
- **"Daisy-chain" design allows expandability up to 2x120 cells**
- **High accuracy and stability for precise data collection**
- **Wide voltage range**
- **Easy set-up with many options for connecting the BVM system to a battery bank**

### DESCRIPTION

The BVM equipment is a battery cell/block voltage measurement system performed on battery banks. It can be used in conjunction with a load device such as the TORKEL. It can also be used to measure cell/block voltages from a PC with TORKEL Win or PowerDB. The BVM system is designed in a modular form where one BVM unit is used for each cell or block in the battery string to be tested. One BVM unit for each cell or block connects to the next in a daisy chain fashion.

The included dolphin clip can easily be removed and exchanged with different styles of standard banana plug clamps and/ or extension cables to accommodate any battery connection requirement.

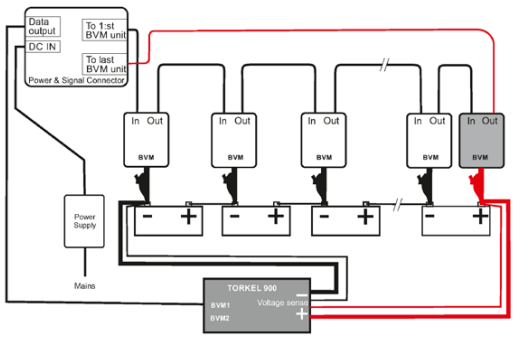
Up to 2 x 120 BVMs can be daisy chained in a single battery bank under test that is used for the capacity testing of large, industrial battery banks commonly found in electrical power substations, telecom facilities and UPS systems generally. When used in conjunction with a load device (e.g. Megger TORKEL) and test data management software (TORKEL Viewer, PowerDB or TORKEL Win) the BVM system facilitates the execution of an automated battery bank capacity test, according to IEC and IEEE standards. The test also meet NERC/FERC requirements. The BVM-system is designed in a modular form where one BVM device is used for each battery cell or "jar" in the string to be tested. One BVM for each battery connects to the next in a "daisy-chain" fashion, thereby providing easy and economical expandability to meet the testing requirements for small-to-large battery bank systems.

Setting up the BVM system for a test is quick and easy. Each BVM unit is identical and can be connected in any battery test position, thus providing maximum flexibility and interchangeability of the BVMs. The BVM "Auto Discovery" feature enables the host device to automatically determine the number of batteries under test and provide sequential identification of each BVM unit in the test string.

### APPLICATION

Each BVM unit is identical and can be connected in any battery test position. A single cable connects the first BVM unit in the string to a Power & signal connector. The BVM system data output is connected via an Ethernet cable to the BVM USB port on TORKEL900 or to a PC with data management SW, e.g. PowerDB or TORKELWin. The BVM system can also be used together with older Megger TORKEL versions, or any battery load bank. This will require the use of a separate PC with test management SW e.g. PowerDB or TORKEL Win.

**Connection example with TORKEL 900**

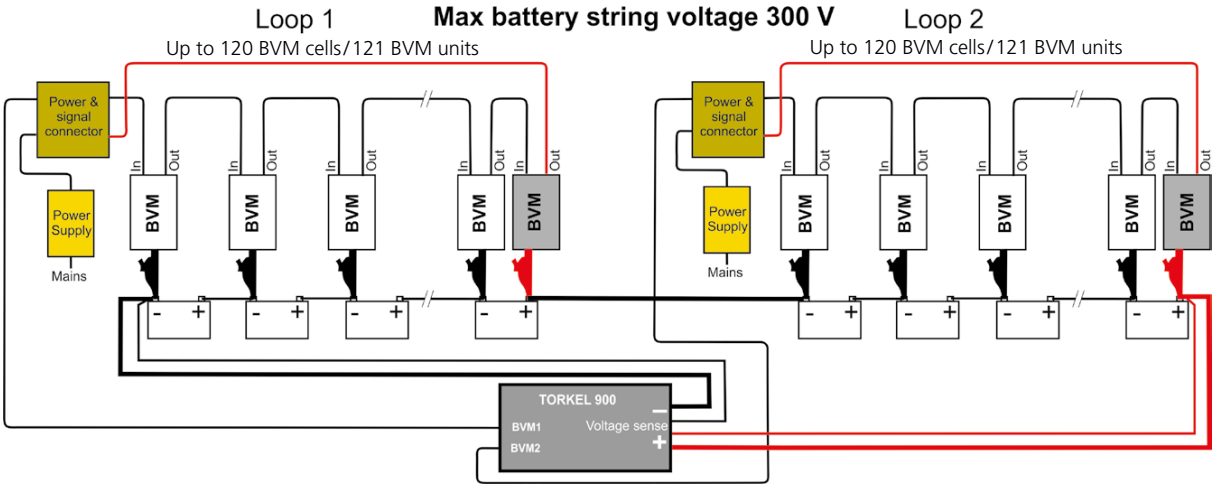



The red dolphin clip in the chain should be connected to the most positive battery pole in the battery bank.
The voltage over each BVM device will be logged throughout the complete discharge test.

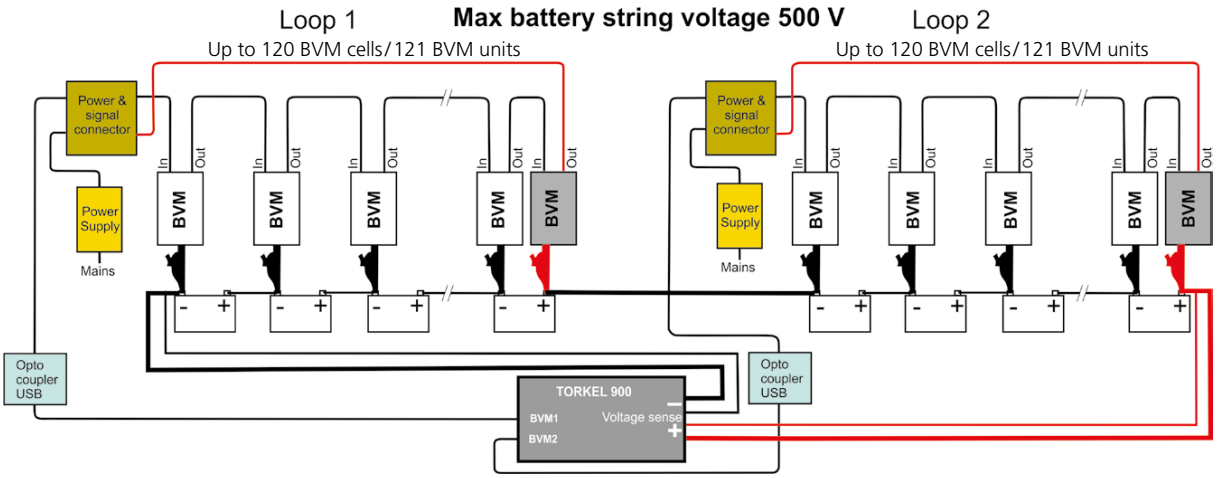
# BVM
## Battery Voltage Monitoring

### CONNECTION EXAMPLES

**With TORKEL 900**

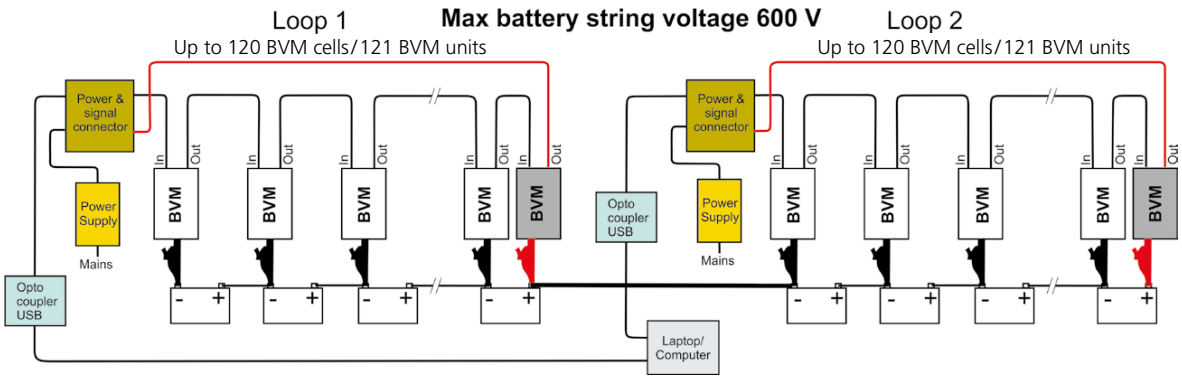



When the battery bank exceeds 120 cells, this connection with 2 BVM loops shall be used.
Connect the first loop to the BVM1 USB port on TORKEL 900 and the second loop to the BVM2 USB port on TORKEL 900.




The connection shown above must be used when the battery bank voltage is between 300 V and 500 V.
It includes two opto couplers and two ungrounded power supplies.

**Without TORKEL 900**




When the total battery voltage exceeds 500 V, TORKEL cannot be used as a load bank. Instead other load banks, or the existing UPS load can be used for doing battery capacity tests.

# BVM
## Battery Voltage Monitoring

### ACCESSORIES FOR CONNECTION OF BVM TO BATTERY

| Included connectors for BVM unit to battery | |
|---|---|
| Dolphin clips<br>40-08320 black<br>40-08322 red |  |
| **Optional connections for BVM to battery** | |
| Extension lead for connecting BVM unit, via clips or similar, to battery<br>04-30050 |  |
| Cable with M8 ring connector, 0.3 m (1 ft)<br>KG-00690 |  |
| Cable with 6.3 mm insulated female flat connector, 0.3 m (1 ft)<br>KG-00692 |  |
| Battery pole bolt M8, screw connection M4<br>40-06300 |  |
| Ground washer<br>B1457-H8<br>45-10046 |  |

### OPTIONAL ACCESSORIES

**PowerDB**
PC software for BVM and TORKEL 800/900-series. For BVM and TORKEL 800 series it works for controlling, data management and report handling, for TORKEL 900-series only for data management and reporting.

**BVM Cal Kit**
Calibration system for BVM units (CJ-90090)


**Opto coupler USB**
When the battery bank voltage exceeds 300 V the BVM system must be used with opto couplers.


### ADDITIONAL EQUIPMENT

For complete information on additional products see appropriate data sheets.

**TORKEL 900-series**
Family of battery load units with automatic and dynamic discharge technology. The TORKEL family is extremely flexible and scalable for various voltages and currents required. Please see separate data sheet for details.

## SPECIFICATIONS

Specifications are valid at an ambient temperature of +25°C, (77°F). Specifications are subject to change without notice.

### Environment

| | |
|---|---|
| **Application field** | The instrument is intended for use in battery rooms found in electric power generating and substations as well as in telecommunication infrastructure and UPS applications in general<br>Altitude <2000 m (6500 ft) above sea level. |
| **Temperature** | |
| Operating | 5°C to +50°C (41°F to +122°F) |
| Storage & transport | 0°C to +60°C (32°F to +140°F) |
| **Humidity** | 5% – 95% RH, non-condensing |

### CE-marking

| | |
|---|---|
| **LVD** | 2014/35/EU |
| **EMC** | 2014/30/EU |
| **RoHS** | 2011/65/EU |

### General

| | |
|---|---|
| **Mains voltage** | 100–240 V AC, 50/60 Hz |
| **Power consumption** | 50 VA *(max)* |
| **Protection** | Overvoltage, reverse voltage, voltage transients, ESD |
| **Dimensions** | |
| BVM unit | 75 x 64 x 25 mm<br>(3" x 2.5" x 1") |
| Carrying case | 575 x 470 x 205 mm<br>(22.6" x 18.5" x 8.1") |
| **Weight** | |
| BVM unit | 0.07 kg (0.15 lbs) |
| With accessories and carrying case | BVM system of 31 units 8.8 kg (19 lbs)<br>BVM system of 61 units 12.5 kg (27 lbs) |

### Measurement section

| | |
|---|---|
| **Maximum number of BVM units** | 242 (2 x 121) |
| **Voltage range** | 0–20 V DC |
| **Resolution** | 1 mV |
| **Inaccuracy** | < 0.1% of full scale ±0.01 V DC |
| **Battery string voltage** | 300 V DC (max per loop) |
| **Measurement input impedance** | 1 MΩ |

## ORDERING INFORMATION

| Item | Part No. |
|---|---|
| **BVM**<br>*Including*:<br>Dolphin clips, Power & signal connector, Power supply, Connection cables and Carrying case<br>On request: TORKEL Win | |
| **BVM150**<br>System of 16 BVM units | CJ-59092 |
| **BVM300**<br>System of 31 BVM units | CJ-59093 |
| **BVM600**<br>System of 61 BVM units | CJ-59096 |
| **BVM special 600 V**<br>System of 46 BVM units[1)]<br>Incl. Dolphin clips, Power & signal connectors, Opto couplers, Power supplies, Connection cables and Carrying case. | CJ-59198 |
| **BVM**<br>Single unit | CJ-59090 |
| **Optional accessories** | |
| **PowerDB**<br>PC software for BVM and TORKEL 800/900-series.<br>BVM and TORKEL 800 series: Control and report<br>TORKEL 900-series: Only report<br>Free to download from www.powerdb.us | |
| **Opto coupler**<br>When battery bank voltage exceeds 300 V | HC-50040 |
| **Extension cable**<br>Extension lead for connecting BVM unit to battery, 0.5 m (1.6 ft) | 04-30050 |
| **Cable with ring connector**<br>Cable with M8 ring connector, 0.3 m (1 ft) | KG-00690 |
| **Cable with insulated flat connector**<br>Cable with 6.3 mm insulated female flat connector, 0.3 m (1 ft) | KG-00692 |
| **Battery bolt adapter**<br>Battery pole bolt M8, screw connection M4 | 40-06300 |
| **Ground washer B1457-H8** | 45-10046 |
| **BVM Cal Kit**<br>Calibration system for BVM units | CJ-90090 |

1) The TORKEL 950 can handle a maximum of 500 V. Battery systems over 500 V and up to 600 V can be tested with BVM and PowerDB or TORKEL Win application on a computer.

BVM600 Transport case (CJ-59096)