

# BaSyTec

## Battery - System - Technology

### CMU

Cell Measurement Unit



Data logging of cell voltages  
and temperatures

Research  
Development  
Production  
Quality control

# Make battery testing safer

BaSyTec is one of the leading manufacturers of battery test systems. Several hundred systems are operated today all over the world. Customers are battery manufacturers, universities, test laboratories, car makers, power tool manufactures and producers of electronic equipment. The ongoing development is strongly optimized to our customer needs. BaSyTec offers today the most powerful battery test software and a wide product range. The Cell-Measurement-Unit (CMU) is an add-on for the test systems. It offers a large number of fast and accurate voltage and temperature inputs.

## Test Requirements

The fast improvement of lithium ion batteries resulted in large battery systems within the last years. A mobile phone uses a single cell, a laptop computer uses 3 or four cells in series and up to three in parallel. Newer cordless power-tools are already operated with 10 cells in series and up to 3 cells in parallel. Battery systems for hybrid electric vehicles or electric vehicles use 50 to 100 cells in series and several strings in parallel. The battery systems are large and a inhomogeneous temperature distribution over the whole battery pack is possible.

Therefore, single cell voltage- and temperature measurements are important to analyze the variation of these signals.

On the other hand tens or even hundreds of signal inputs must be configured and the large amount of stored data must be handled. Sophisticated software tools are necessary to make this work simple and to avoid mistakes in configuration and data handling.

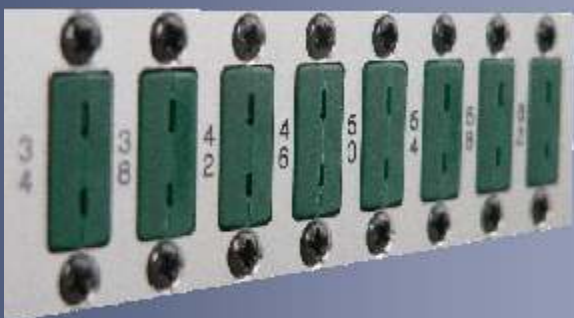


Car Battery-Pack of a Mitsubishi-i-electric car.

## Typical Applications

Cell voltage and temperature monitoring is important during the development of storage systems, especially if the final battery management system is not available or the variation of the cell signal is of high interest.

- All Large lithium batteries that are operated without battery management system.
- All batteries where a special interest in single cell characteristic or temperature variation is of interest.
- Other applications where many voltages and or temperatures must be monitored.



Up to 480 inputs within one system are possible.

# Configuration and Technical Specification

## Configuration I

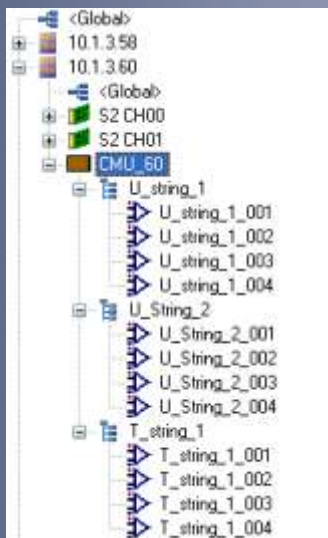
The CMU is an independent unit with up to 480 inputs. It is organized in modules with 32 signal inputs. Each module has 8 sub-groups with 4 inputs. Modules are available for standard cell voltages that have a maximum DC offset to earth of 60V.

For high voltage batteries the HV cell voltage module is available with a maximum offset voltage to earth of 1000V.

For temperature measurement modules for Pt1000 and type K thermocouples are available. Within one CMU, different modules can be installed.



CMU stand alone System with 32 voltage and 32 thermocouple inputs. For low input count the modules can also be installed directly in a BaSyTec Battery Test System.



## Configuration II

The software allows user-defined grouping of input lines. From each defined group calculated values, as

- Standard deviation or spread
- Minimum
- Maximum
- Mean value

are available. Single values, calculated values and whole groups are available for registration and as termination criteria. Groups of signals can simply be used within the testplan, for example for registration and for process control.

## General specification

Max. number of inputs	Up to 480
Max. Number of inputs per group	32
Inputs per group	4, each belonging to a different row
Isolation	Each sub-group has its own base potential „Ref.” and is isolated against all others and earth
Synchronisation	< 2µs between inputs of one row < 25µs synchron to main time base (main current), 2ms asynchron 2ms between subsequent rows
Max. Sample rate	5ms per one row (120 inputs) 20ms for all inputs (480 inputs)
Size (w*h*d)	450*190*500mm (up to 5 groups) 450*320*500mm (up to 10 groups) 450*450*500mm (up to 15 groups)

# Input Specification

<p>Standard cell voltage inputs</p> <ul style="list-style-type: none"> <li>•Voltage measurement range</li> <li>•Max.D.C. offset to earth</li> <li>•Max D.C. voltage within one sub-group</li> <li>•Voltage - impedance vs. Ref.</li> <li>•Input impedance vs. earth</li> <li>•Precision</li> <li>•Resolution</li> <li>•Connector</li> </ul>	<p>0-5V 60V DC 50V DC with specified precision 60V DC with reduced precision 400 k &gt; 10 M 2.5mV &lt; 0.2mV Tyco PE, 1 per sub-group (4 inputs)</p>
<p>Reference voltage inputs</p> <ul style="list-style-type: none"> <li>•Voltage measurement range</li> <li>•Max.D.C. offset to earth</li> <li>•Max D.C. Voltage within one sub-group</li> <li>•Voltage - impedance vs. Ref.</li> <li>•Input Impedance vs. earth</li> <li>•Precision</li> <li>•Resolution</li> <li>•Connector</li> </ul>	<p>+/- 6V 60V DC 10V DC with specified precision &gt; 10 M &gt; 10 M 2.5 mV &lt; 0.2 mV Tyco PE, 1 per sub.group (4 inputs)</p>
<p>HV cell voltage inputs</p> <ul style="list-style-type: none"> <li>•Voltage measurement range</li> <li>•Max.D.C. offset to earth</li> <li>•Max D.C. voltage within one connector</li> <li>•Max D.C. voltage within one sub-group</li> <li>•Voltage - impedance vs. Ref.</li> <li>•Input impedance vs. Earth</li> <li>•Precision</li> <li>•Resolution</li> <li>•Connector</li> </ul>	<p>0-5V 1000V DC 600V 50V DC with specified precision 250V DC with reduced precision 400 k &gt; 10 M 2.5 mV &lt; 0.2 mV Harting DD, 1 connector per group</p>
<p>Pt1000 temperature inputs</p> <ul style="list-style-type: none"> <li>•Measurement range</li> <li>•Input impedance vs. earth</li> <li>•Precision</li> <li>•Resolution</li> <li>•Connector</li> </ul>	<p>-40°C - 100°C &gt;10 M 1°C &lt; 0.1°C Harting DD or TYCO PE</p>
<p>Type-K thermocouple inputs</p> <ul style="list-style-type: none"> <li>•Measurement range</li> <li>•Input impedance vs. earth</li> <li>•Precision</li> <li>•Resolution</li> </ul>	<p>-40°C - 100°C &gt; 10 M 3°C &lt; 0.1°C</p>

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