




Safety Instructions

HV Breakout Module Type 1.2+U



General safety instructions

Please observe the following safety instructions and signs provided with the measurement modules as well as the safety-specific information in the accompanying technical documentation.

WARNING!	
	<p>HV Breakout Modules (HV BM) are used in high-voltage applications. Improper handling of HV Breakout Modules may result in electrical shocks which are dangerous to life.</p> <ul style="list-style-type: none">☞ Only use qualified and trained personnel.☞ Observe safety instructions.
	<p>The housing cover can be opened for mounting or dismantling the HV power cables.</p> <ul style="list-style-type: none">☞ Before handling, especially before opening the cover, make sure that the HV power cables have been disconnected.☞ Fasten HV power cables only with the supplied or, alternatively, suitable ring terminals and nuts.☞ Observe the mounting instructions in the installation manual. It is particularly important that cover and cable glands are properly mounted in order to ensure the tightness of the housing.
	<p>When using HV power cables made of aluminum, the contact resistance between the aluminum conductor and the connection component (cable lug) of an electrochemically nobler metal (copper), the contact resistance between the two components increases.</p> <p>This can lead to a massive temperature increase and in the worst case to the development of fire.</p> <ul style="list-style-type: none">☞ When connecting HV Breakout Modules by means of copper cable lugs, only use HV power cables made of copper! <p>Aluminum HV power cables require a specific connection technology. Please contact our technical support for further information.</p>

WARNING!

For +U mode measurements, one of the potential taps is made directly at the module housing. Due to the internal resistance over the isolation barrier of the measurement input, the effective isolation resistance in +U mode operation will be reduced from 50 GΩ to 4 MΩ. If the module is not operated in +U mode, the effective isolation resistance will not be reduced.

- ☞ Only use qualified and trained personnel.

WARNING!

The improper opening of the device housing impairs the operational safety of the HV measurement module and entails the risk of life-threatening electrical shocks.

- ☞ Open the housing only to connect the HV power cables and then close it properly.
- ☞ Do not carry out any mechanical or electrical modifications on the HV measurement module.
- ☞ Do not replace the shunt module.
- ☞ Only operate the measurement module with a closed housing.

HV Breakout Modules are not integrated into the interlock loop. If the cover is not mounted, the non-isolated contacts may carry high-voltage.

WARNING!

The internal temperature of the measurement module and the shunt temperature must not exceed +120 °C. As soon as that value is exceeded, the module will send the error value "0x8001" instead of a measured value until the temperature value drops below +115 °C.

Exceeding the limit impairs the operational safety of the HV measurement module and entails the risk of life-threatening electrical shocks.

- ☞ Switch off the power supply or interrupt the current flow through the shunt to prevent further temperature increase of the module.
- ☞ Always monitor the temperature of the shunt and the internal temperature of the measurement module in order to make sure at any time that they do not overheat.

→ See chapter "Temperature monitoring" in the Installation Manual.

WARNING!

The measurement module has to be connected to the vehicle chassis (ground leakage monitor) or protective earth (PA/PE) in order to ensure user safety.

If the ground connection is not established, there is danger to life due to high voltage.

- ☞ Connect the measurement module to ground (PE) using a suitable ground cable.
- ☞ Make sure that this work is only carried out by qualified and trained personnel.

CAUTION!

If several HV BM 1.2+U are connected in parallel and operated in +U mode, the internal resistances over the isolation barrier of the measurement inputs can cause the effective isolation resistance to drop to such an extent that the ground leakage monitor will respond.

- ☞ Make sure that the insulation resistance does not drop below the threshold value of the ground leakage monitor when applying these measurement setups.

CAUTION!



The measurement module heats up considerably if it is operated in a corresponding working environment (e.g. engine compartment). The shunt also heats up considerably during operation under high load. The surface and the inside of the measurement module may therefore become extremely hot.

A **permanent measurement of high currents** should be avoided in order to prevent the internal temperature of the module from exceeding the permissible range.

Touching the surface may cause serious burns.

- ☞ Let the measurement module cool down before handling, especially before opening the orange-colored cover.
- ☞ Wear appropriate safety gloves, if required.



- ▶ To verify the operational safety of an HV Breakout Module, an isolation test in accordance with EN 61010-1:2020 needs to be performed at least once per year.
- ▶ Before initial operation, read the entire documentation that has been delivered with the HV Breakout Module thoroughly. The operating personnel has to be instructed accordingly. Please contact CSM GmbH with any further questions.

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