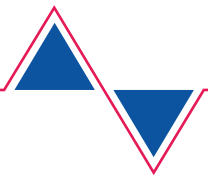


Operating manual

High-voltage measurement adapter set HPS40-2

11.ST.2210.2440_BA_V02_EN



Version	Date	Reason
V01	23.02.2022	First edition
V02	03.02.2025	Better description of testing HPS40, new layout

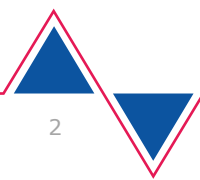
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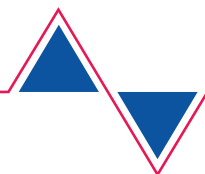
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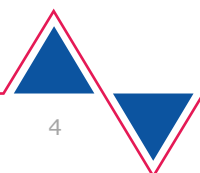


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1 Introduction

1.1 Preliminary information

Read through this operating manual carefully before using the product.

The product is delivered with a USB stick containing the operating manual in various languages. You can find the current version and additional languages on our homepage.

There is a QR code on the product. You can scan this QR code with a device that is connected to the internet to go directly to the download area for your product.

The operating manual is an essential part of the product and must be kept together with the product. If you sell or transfer ownership of the product, the operating manual must be handed over to the new operator.

In addition to this operating manual, you must observe all relevant regulations for diagnostics or fault finding of intrinsically safe high-voltage systems in road vehicles. This includes but is not limited to: instructions for the vehicle manufacturer's diagnostics systems, company-specific safety requirements and the state of the art for working with high-voltage systems.

1.2 Validity of the declaration of conformity

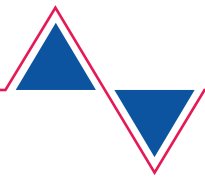
The declaration of conformity applies to the product described in the operating manual. Any changes, modifications or extensions shall void the declaration of conformity and the risk assessment.

1.3 Manufacturer specifications

Since its founding, our company has focused on groundbreaking solutions for electromobility. STODIA GmbH develops and produces custom solutions for the automotive industry, the energy storage sector, repair shops and special vehicle fleets.

Our core products are innovative energy storage systems, both stationary and mobile, which are essential technologies for advancing the energy revolution and energy autonomy. STODIA's portfolio also includes smart charging and battery technology, diagnostic systems, battery and cell management, and vehicle-wide measurement and diagnostic technology.

With experience in both software and hardware development, STODIA GmbH is your dependable partner at every production stage, from prototyping to series production – MADE IN GERMANY.



2 Safety

This safety chapter provides information about the following:

- The warning levels contained in this operating manual
- Important safety instructions for the product
- Intended use of the product
- Requirements for the target group
- Duties of the operator

This operating manual is only valid for the following product:

Item number	22102440
Designation	High-voltage measurement adapter set HPS40-2

2.1 Warning levels

This chapter provides information about the warning levels used in this operating manual.

DANGER

Failure to observe the safety instructions WILL result in death or serious injury!

WARNING

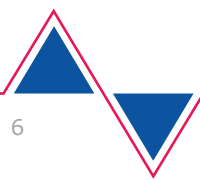
Failure to observe with the safety instructions CAN result in death or serious injury!

CAUTION

Failure to observe the safety instructions CAN result in minor physical injury!

CAUTION

Failure to observe the safety instructions can lead to damage to the product!



2.2 Important safety instructions

This chapter contains the safety instructions that must be observed when handling the product.



DANGER

Danger of fatal electric shock

The electrical voltage in other systems is lethal and will cause death by electric shock.

- Do not use the product for measurements on utility power circuits!
- Never attempt to power other devices with the product!



WARNING

Risk of explosion

Product components may produce sparks and electric arcs.

- Never disconnect high-voltage plug connections while under load!
- Do not use the product in potentially explosive atmospheres!
- Ensure that the product is at least 50 cm above the ground during operation!



WARNING

Danger of fatal electric shock

The electrical voltage in high-voltage systems is lethal and can cause death by electric shock.

Liquids, condensation and high humidity can cause short circuits!

- Do not let the product come into contact with liquids!
- Use the product only according to the technical data!

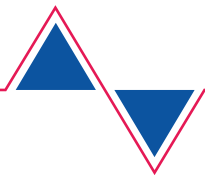


WARNING

Danger of fatal electric shock

Defective and damaged products can no longer guarantee protection against electrical voltage.

- Do not let the product come into contact with chemicals!
- Replace a defective or damaged product immediately!
- Never attempt to repair or tamper with the product!



2.3 Intended use

Use the product only in accordance with this operating manual; otherwise the electrical hazard protection provided by the product can no longer be guaranteed.

The product is a set of high-voltage measurement adapters for measuring high-voltage systems in electric vehicles at the on-board plug connection specified by the vehicle manufacturer.

The product is equipped with safety resistors and is suitable for the following measurements:

- Certified test for de-energized circuit according to the manufacturer's specifications
- Insulation resistance measurement
- Continuity measurement

The bridging adapter (item no. 22102436) supplied with the measuring adapter set may be used only for the purpose of testing the function of the high-voltage measurement adapter (item no. 22102066)!

The high-voltage adapter cable (item no. 22102431) is intended solely for measurements on electric vehicles that have been certifiably de-energized.

In this operating manual, the term 'vehicle manufacturers' refers solely to vehicle manufacturers in the BMW Group.

Any use beyond what is listed here is prohibited.

2.4 Requirements for the target group

Only qualified personnel may work with this product!

In this operating manual, qualified personnel is defined as personnel meeting all requirements for working on high-voltage systems applicable in the country of operation, as defined by:

- Regulations applicable in the country of operation
- Qualification according to DGUV 200-005 level 2 or higher, or equivalent
- Specifications from the vehicle manufacturer and/or the operator.

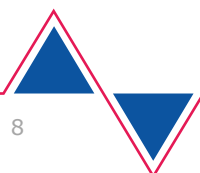
At all times while using the product, staff must wear the personal protective equipment prescribed by the vehicle manufacturer for work on high-voltage systems.

2.5 Duties of the operator

The operator is responsible for ensuring that all staff working with the test adapter fulfills the requirements for the target group.

Furthermore, the operator is responsible for ensuring the following:

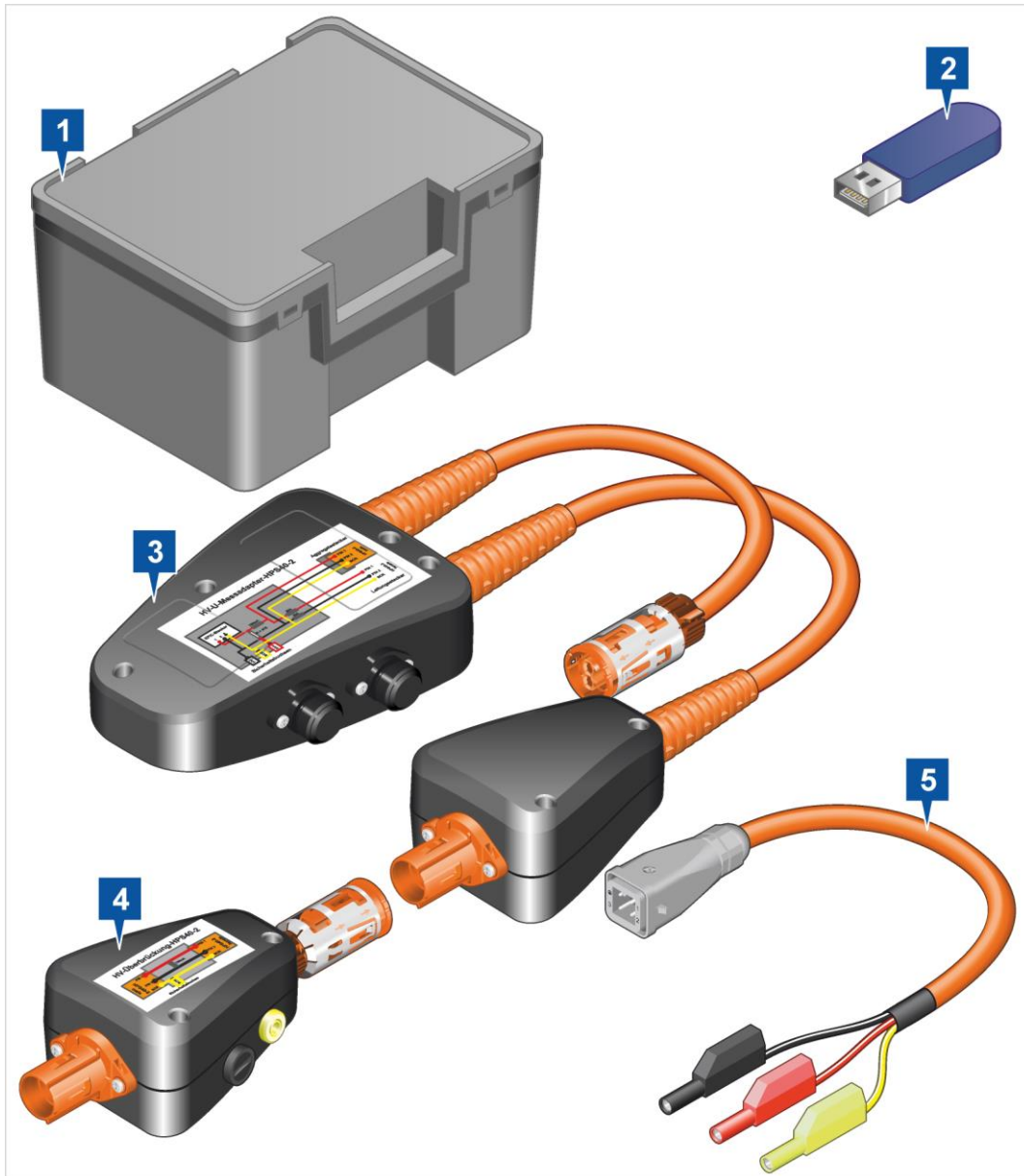
- The test adapter is always in perfect working order.
- The regular inspection intervals for the test adapter are observed and recorded.



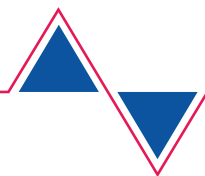
3 Product description

3.1 Scope of delivery

Immediately check the condition of the product and the completeness of the delivery. If anything is missing or defective, please contact the manufacturer immediately.



- (1) Carrying case
- (2) USB stick with operating manual
- (3) High-voltage measurement adapter HPS40-2 (item no. 22102066)
- (4) High-voltage bridging adapter HPS40-2 (item no. 22102436)
- (5) High-voltage adapter cable HPS40-2 (item no. 22102431)



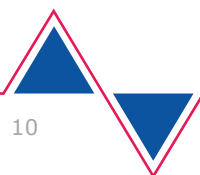
3.2 Design

3.2.1 High-voltage measurement adapter HPS40-2 (item no. 22102066)

Product design:

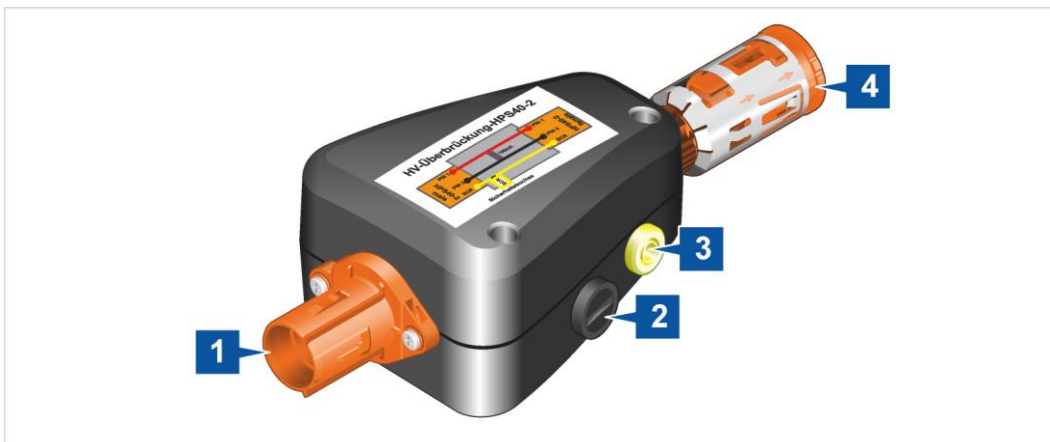


- (1) EPIC socket for high-voltage adapter cable
- (2) Test sockets (see wiring diagram)
- (3) 20 A fuse – HV-
- (4) 20 A fuse – HV+
- (5) “Hirschmann” plug
- (6) “Hirschmann” unit plug



3.2.2 High-voltage bridging adapter HPS40-2 (item no. 22102436)

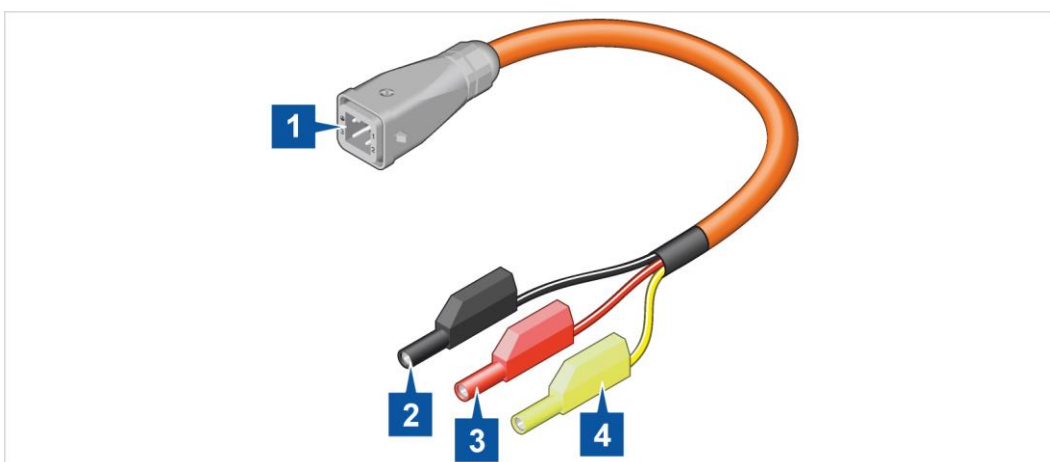
Product design:



- (1) "Hirschmann" unit plug
- (2) 0.1 A fuse
- (3) Test socket (see wiring diagram)
- (4) "Hirschmann" plug

3.2.3 High-voltage adapter cable HPS40-2 (item no. 22102431)

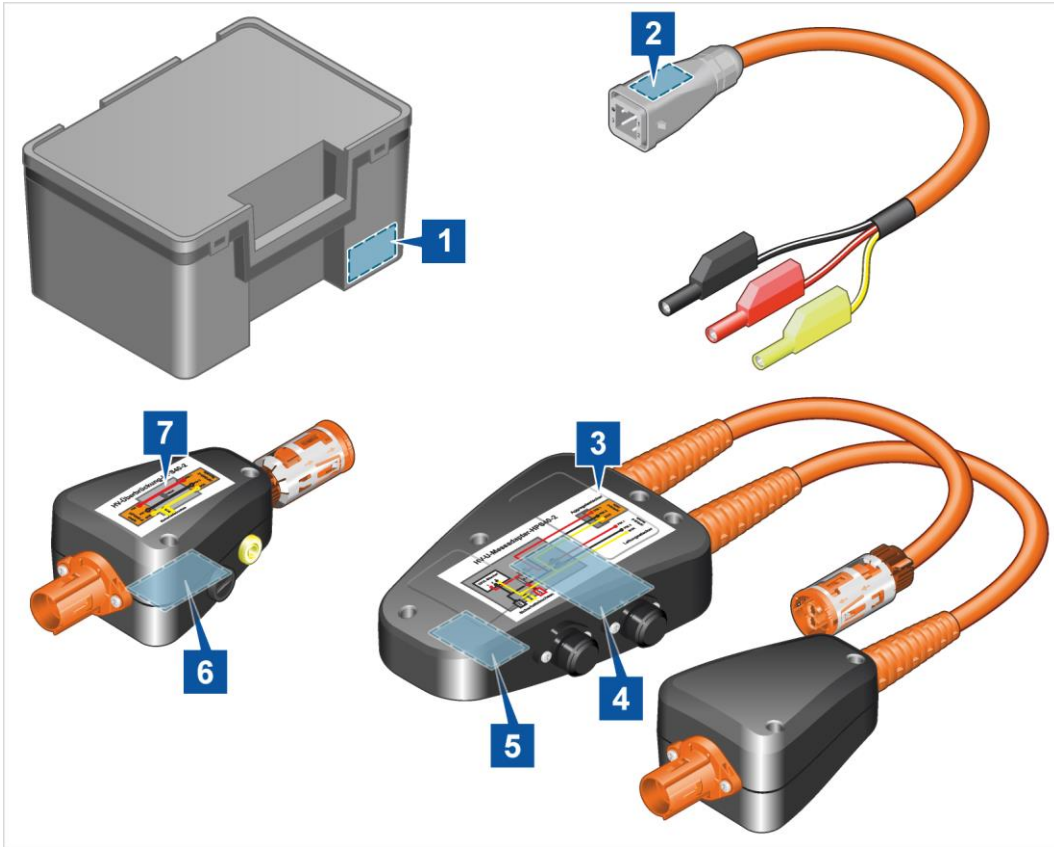
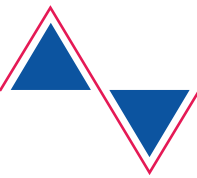
Product design:



- (1) Measurement adapter plug
- (2) HV- test plug
- (3) HV+ test plug
- (4) PE test plug

3.3 Symbols and connections

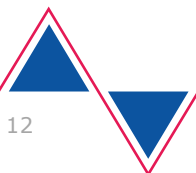
Stickers and nameplates are applied to the components of the measurement adapter set in the following positions:




Position	Description
1	Carrying case nameplate
2	Nameplate for measurement adapter cable
3	Wiring diagram for high-voltage measurement adapter
4	Nameplate for high-voltage measurement adapter
5	Warning of electrical hazard
6	Nameplate for bridging adapter
7	Wiring diagram for high-voltage measurement adapter

3.3.1 Warning sign







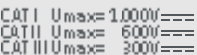
Figure	Function
	<p>The sticker warns of the electrical danger of the high-voltage measuring adapter.</p>

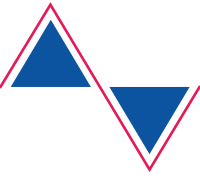


3.3.2 Nameplates

Figure	Function
	<p>The nameplates contain the following information:</p> <ul style="list-style-type: none"> • Manufacturer information • Manufacturer part number • Product type • Serial number • User requirements <p>You can use the serial number to track information relating to production.</p>

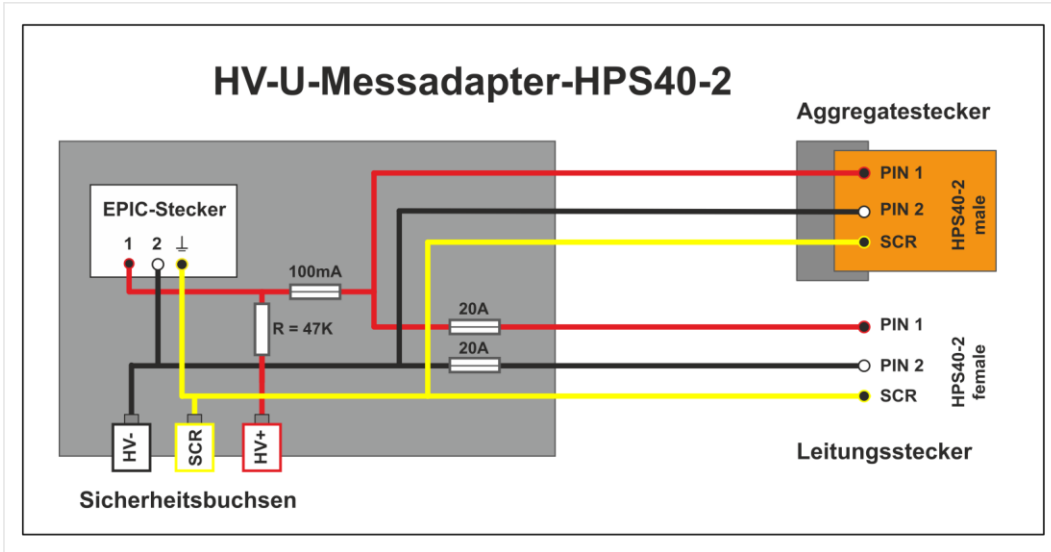
The following symbols are shown on the product stickers:

Symbol	Meaning
	<p>Electrical hazard!</p>
	<p>This symbol warns of the risk of electric shock!</p>
	<p>Observe the operating manual!</p>
	<p>The product complies with protection class II, meaning it has increased or double insulation between active and accessible parts in accordance with VDE 0100, Part 410/412.1.</p>
	<p>The disposal instructions prohibit disposal of the product with household waste. Always dispose of the product in accordance with all local disposal regulations.</p>
	<p>The CE marking certifies that the product complies with all applicable European regulations and has been subjected to the prescribed conformity assessment procedure.</p>
	<p>Indicates which measurement categories the product is intended for according to IEC 61010-31. The rated voltage is based on the measurement category.</p>

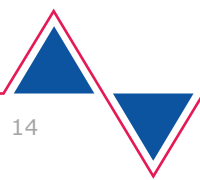
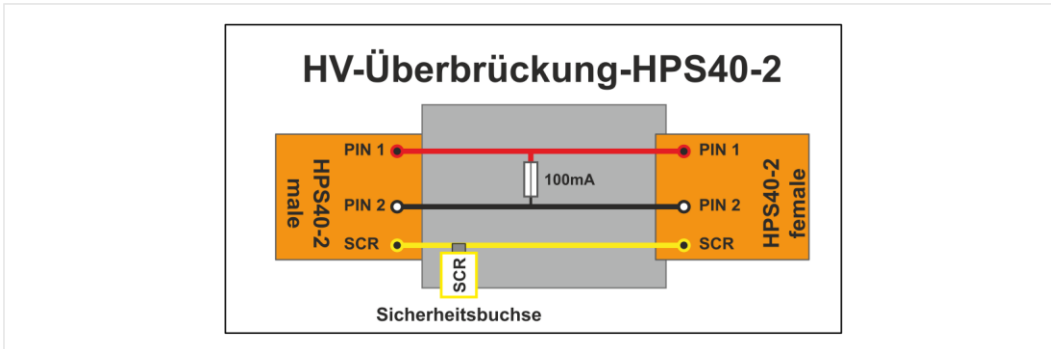


3.4 Wiring diagram

3.4.1 High-voltage measurement adapter (CC item no. 22102066)



3.4.2 High-voltage bridging adapter (CC item no. 22102436)



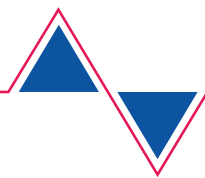
3.5 Technical data

3.5.1 High-voltage measurement adapter

Rated data	Values
Manufacturer number	22102066
Maximum rated voltage	CAT I: DC 1000 V CAT II: DC 600 V CAT III: DC 300 V
Maximum rated current	≤ DC 60 V: 1000 mA > DC 60 V: 2 mA
Protection class	II / double insulated
Weight	~ 1500 g
Dimensions L/H/W	1150 mm/95 mm/150 mm
Cable length	850 mm

3.5.2 High-voltage bridging adapter

Rated data	Values
Manufacturer number	22102436
Maximum rated voltage	CAT I: DC 1000 V CAT II: DC 600 V CAT III: DC 300 V
Maximum rated current	≤ DC 60 V: 1000 mA > DC 60 V: 2 mA
Protection class	II/double insulated
Weight	~ 350 g
Dimensions L/H/W	~230 mm/60 mm/105 mm

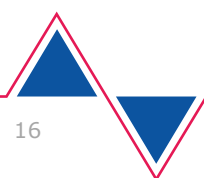


3.5.3 High-voltage adapter cable

Rated data	Values
Manufacturer number	22102431
Maximum rated voltage	CAT I: DC 1000 V CAT II: DC 600 V CAT III: DC 300 V
Maximum rated current	≤ DC 60 V: 1000 mA > DC 60 V: 2 mA
Protection class	II / double insulated
Weight	~150 g
Dimensions L/H/W	~1020 mm/40 mm/40 mm
Cable length	~880 mm

3.5.4 Ambient conditions

Ambient conditions	Operation	Storage	Transportation
Temperature	5°C to 40°C	-20°C to 60°C	-20°C to 60°C
Elevation above sea level	max. 2000 m	No limitation	
Humidity	Max. 80% up to 31°C, decreasing linearly to 50% at 40°C	Max. 85%	
	Condensation not permitted. Maximum permissible relative humidity: 60% in environments with corrosive gas/air.		



4 Operation

This chapter provides information about the following activities:

- Startup
- Detaching the plug connection
- Cleaning
- Storage and transportation
- Disposal
- Maintenance



DANGER

Danger of fatal electric shock

The electrical voltage in high-voltage systems is lethal and will cause death by electric shock!

Personal protection cannot be guaranteed if the high-voltage test adapter is faulty!

- Always carry out a self-test of the high-voltage test adapter before performing a certified test that the circuit is de-energized!



WARNING

Danger of fatal electric shock

The electrical voltage in high-voltage systems is lethal and can cause death by electric shock.

- Use the product only for the applications intended by the vehicle manufacturer!

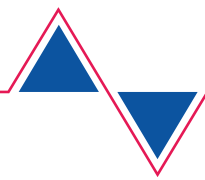


CAUTION

Risk of damage!

Plug connections lock into place when attached.

- Unlock the plug connections before detaching them! (see the chapter “Detaching the plug connections”)

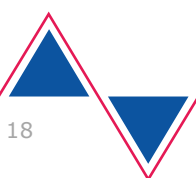
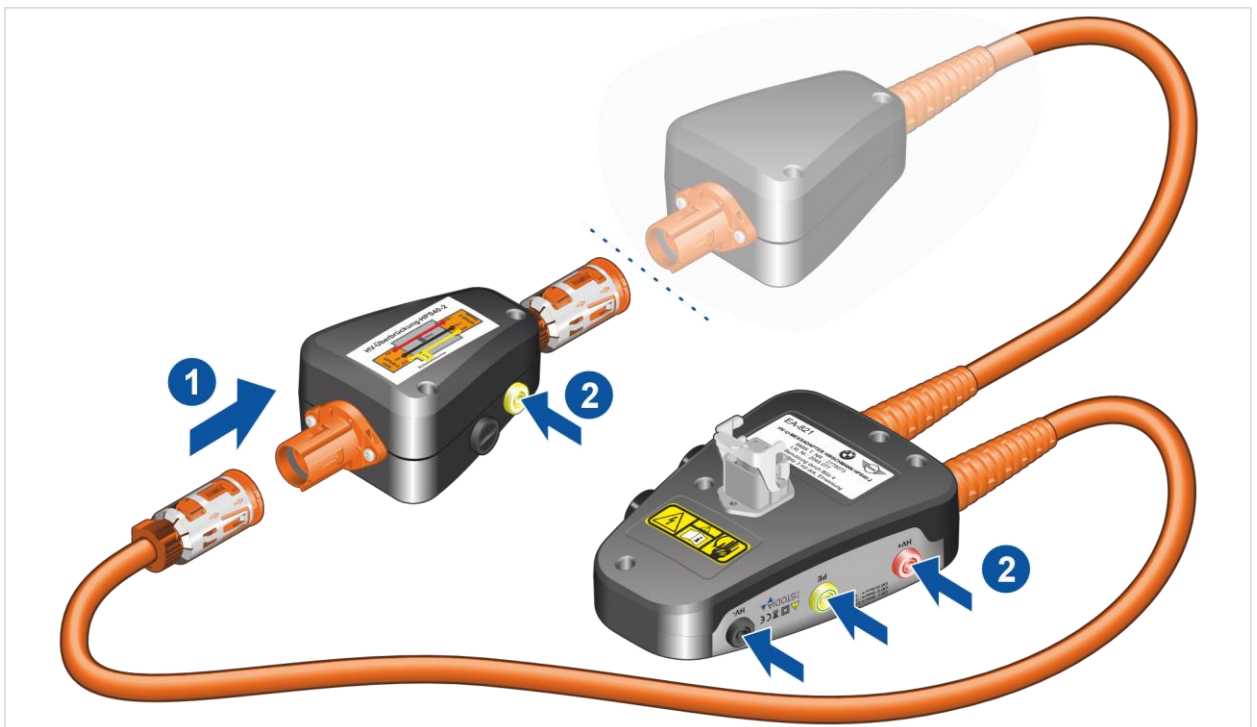


4.1 Startup

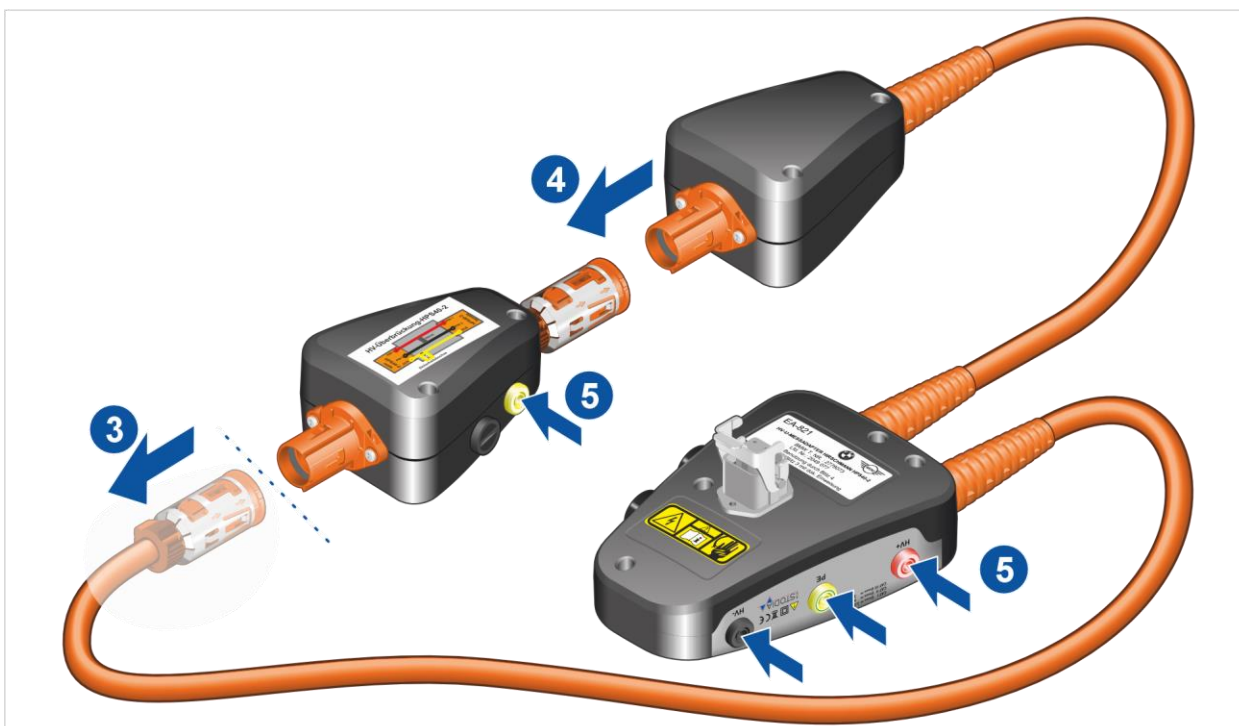
4.1.1 Testing the high-voltage test adapter

Before performing a certified test that the circuit is de-energized, you must always check that the high-voltage test adapter (item no. 22102066) is working correctly. To do so, conduct a continuity test using the high-voltage bridging adapter (item no. 22102436). This must be performed separately for both plugs (plug and unit plug).

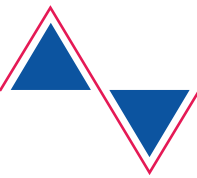
1. Connect the high-voltage bridging adapter to the “Hirschmann” plug.
2. Perform the continuity measurement on the laboratory safety sockets.



3. Disconnect the high-voltage bridging adapter from the “Hirschmann” plug.
4. Connect the high-voltage bridging adapter to the “Hirschmann” unit plug.



5. Perform the continuity measurement on the laboratory safety sockets.
- ✓ If the continuity measurement is successful, you can use the high-voltage test adapter for the certified test that the circuit is de-energized.

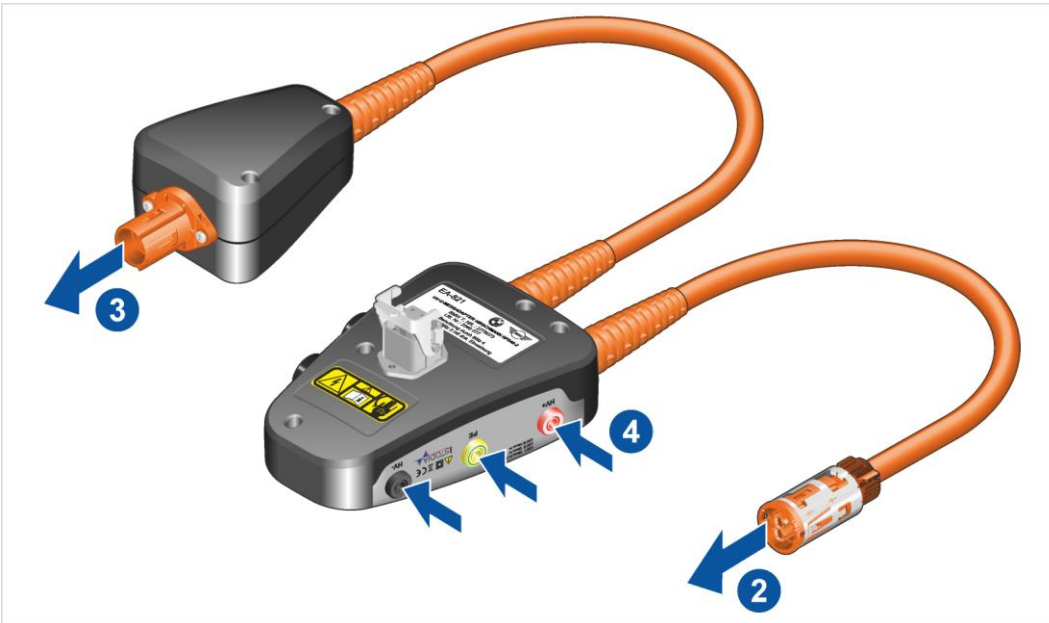


4.1.2 Testing that the circuit is de-energized

You can determine that the circuit is de-energized on the laboratory safety sockets of the high-voltage test adapter.

Requirement:

- The high-voltage test adapter was tested successfully (see “Testing the high-voltage test adapter” chapter).
1. Observe the safety instructions.



2. Connect the plug to the disconnected socket of the connection you want to test.
 3. Connect the unit plug to the disconnected socket of the connection you want to test.
 4. Connect the high-voltage measurement module, multimeter or insulation resistance tester to the test sockets on the high-voltage test adapter.
- ✓ You can now check that the circuit is de-energized.

4.1.3 Performing further measurements

If you need protection by means of safety resistors, you can also perform further measurements using the plug connection that you use to check that the circuit is de-energized.

4.1.4 Performing measurements using the high-voltage adapter cable

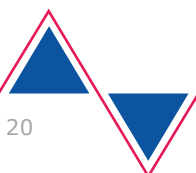


DANGER

Danger of fatal electric shock!

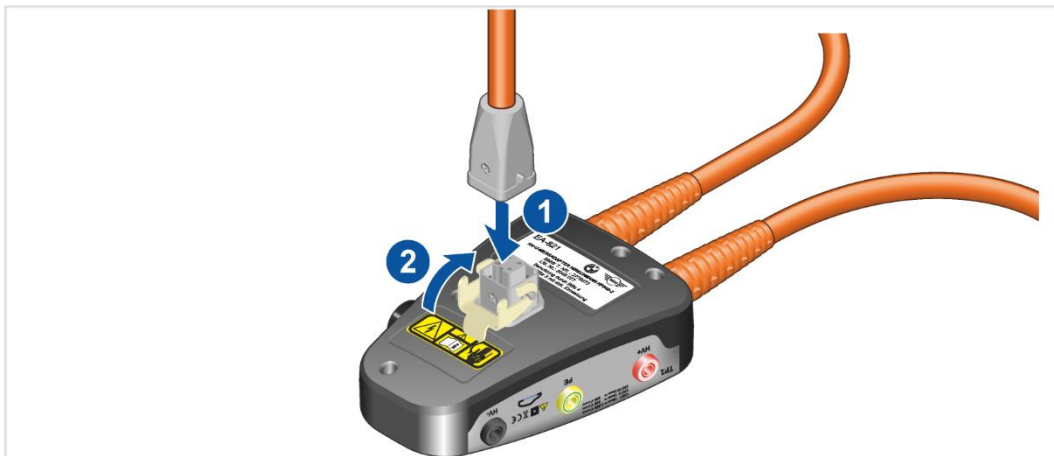
The electrical voltage in high-voltage systems is lethal and will cause death by electric shock!

- Perform this measurement only on high-voltage systems and components that have been certifiably de-energized!

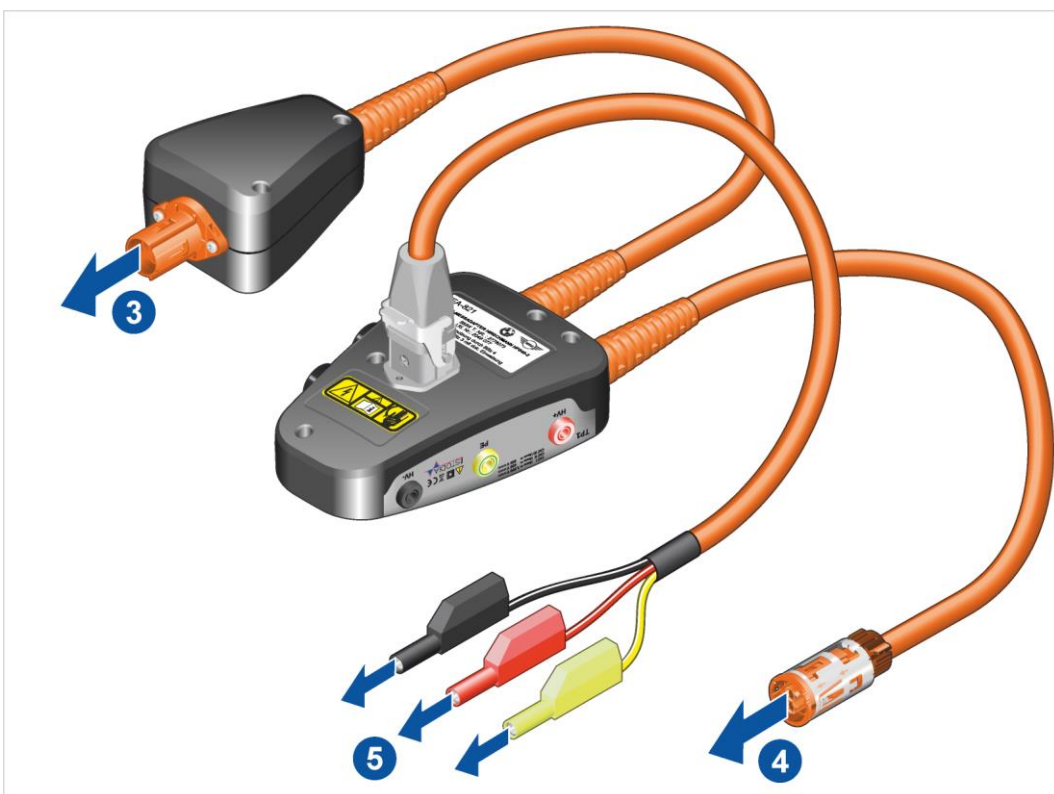


If you want to carry out measurements without the protection of safety resistors, you can use the supplied high-voltage adapter cable.

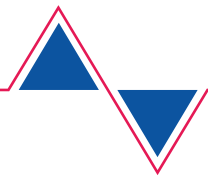
1. Connect the plug to the EPIC socket on the high-voltage test adapter.
2. Lock this connection by pushing the lever up.



3. Connect the plug to the disconnected socket of the connection you want to test.
4. Connect the unit plug to the disconnected socket of the connection you want to test.
5. Connect the high-voltage measurement module, multimeter or insulation resistance tester to the test sockets on the high-voltage test adapter.



- ✓ You can now perform the measurements.

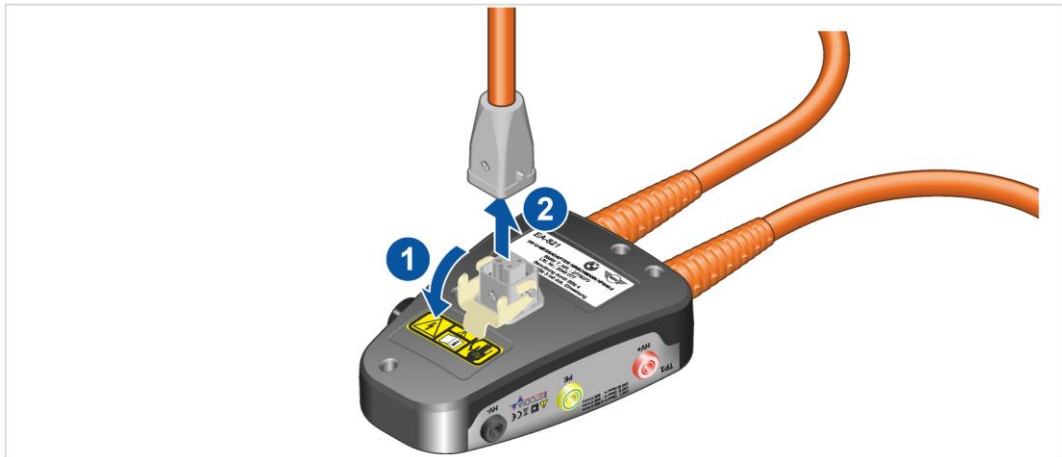


4.2 Detaching the plug connections

4.2.1 Detaching the plug connection of the high-voltage adapter cable

The plug connection has a manual locking mechanism. To release the plug connection:

1. Move the lever downward.
2. Pull the plug connection apart.



✓ The plug connection is now detached.

4.3 Cleaning



DANGER

Danger of fatal electric shock

The electrical voltage in high-voltage systems is lethal and will cause death by electric shock.

- Disconnect the product from all power sources before cleaning the product!

Observe the safety instructions!

Use only a dry cloth to clean the product.

4.4 Storage and transportation

Store and transport the product only in the carrying case (see the “Scope of delivery” section).

4.5 Disposal

Observe the safety instructions!

Always dispose of the product in accordance with all local disposal regulations.



4.6 Maintenance

Observe the safety instructions!

National and local requirements for regular testing must be observed!

Test the product for proper function at intervals of no more than 24 months.

Contact the manufacturer to have a professional function test performed.

4.6.1 Replacing fuses



DANGER

Danger of fatal electric shock

The electrical voltage in the product is lethal and will cause death by electric shock!

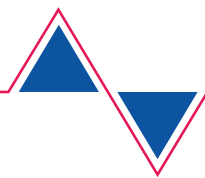
- Disconnect the product from all plug connections before performing any maintenance work!

The product contains several fuses (see “Design” chapter). The following steps tell you how to replace a fuse.

The process shown here is an example and is applicable to all fuses.



3. Open the fuse chamber.
 4. Remove the faulty fuse.
 5. Replace the faulty fuse with a new one of the same type.
 6. Insert the fuse into the fuse chamber.
 7. Screw the fuse chamber closed.
- ✓ You have replaced the fuse.



5 Help

5.1 Warranty

STODIA GmbH grants a warranty period of 24 months from the date of purchase. The warranty is valid for demonstrable defects in functional material and workmanship.

Further information on the warranty conditions can be found in the terms and conditions on the manufacturer's website.

5.2 Customer service

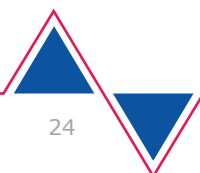
Always include the item number and, if available, the serial number with any product queries. Both numbers are found on the product.

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Translation of the original operating manual.
Subject to technical changes.

 **STODIA**_{GMBH}
SPEICHER & DIAGNOSETECHNIK
