

# INSTALLATION INSTRUCTIONS

**HUBER+SUHNER**

**HUBER+SUHNER AG**

Automotive

RADOX® EV-C cable system

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## RADOX® EV-C cable system

### 1. Purpose of this document

The purpose of the document is to provide instructions to install the cable system, RADOX® EV-C.

### 2. Introduction

This installation instruction is a reference for the high voltage cable system used in fuel cell and electric vehicles.

The RADOX® EV-C cable system is designed for ambient temperatures between -40°C to 140°C. It is validated acc. to VW80332 using a shielded RADOX® cable with a size range from 16mm<sup>2</sup> up to 120mm<sup>2</sup> and 2x4, 2x6, 3x6 and 4x10mm acc. to ISO19642-9. The whole system is classified as per defined voltage ranges of voltage class B (see ISO 6469-3), including HV circuits that use AC or three phase current components, such as electric drive system. When plugged in, the system will fulfill the following degrees of protection as per ISO 20653: IP6K9K, IP6K7, also: after aging and with Arizona dust.

The RADOX® EV-C cable installation configuration is specified by the customer: length of the cable, connectors at both ends or one end, with or without cable lugs and lastly with or without counter nuts.



### 3. Safety information

The instructions in this manual are not intended as a substitute for appropriate automotive training, and the description of this manual does not provide adequate experience for the safe operation of the equipment. Therefore, only competent technicians who are familiar with this equipment should install, operate, and service RADOX® EV-C cable system.


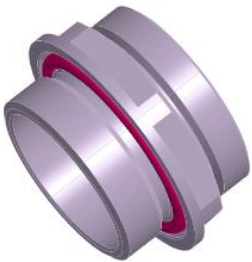

A competent technician must:

- Be thoroughly familiar with these instructions.
- Be trained in automotive industry-accepted high and low-voltage safe operating practices and procedures.
- Be trained and authorized to energize, de-energize, clear, and ground power distribution equipment.
- Be trained in the care and use of protective equipment such as safety glasses, face shield, rubber gloves etc.

Each RADOX® EV-C cable system is inspected and tested at the factory and is in good condition when accepted by the carrier for shipment. Upon receipt of a cable system, inspect it thoroughly for damage and loss of parts incurred during shipment. If damage or loss is discovered, file a claim with the carrier immediately.

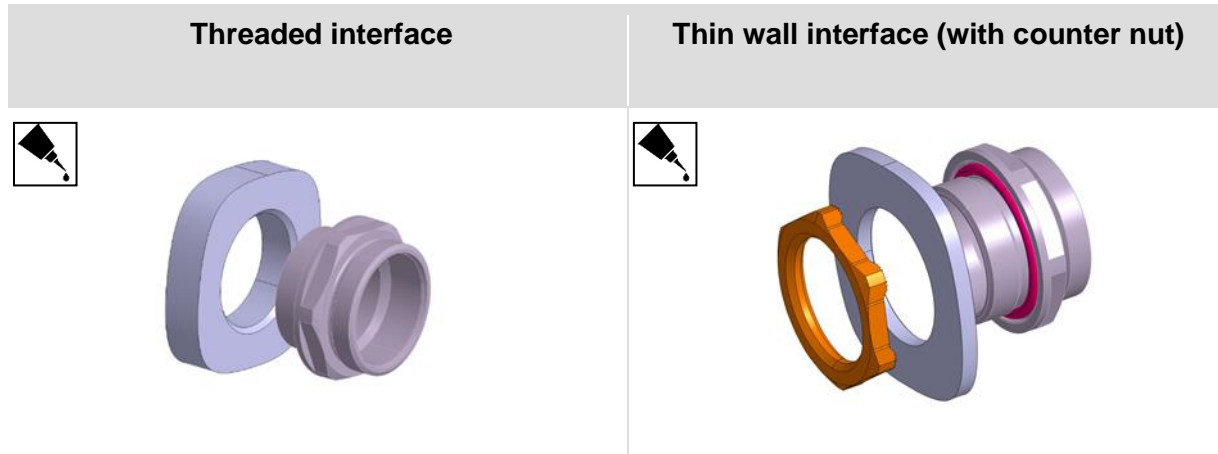
Please read this document through carefully. It contains important information about the general handling of HUBER+SUHNER cable systems. HUBER+SUHNER accepts no liability for damage caused as a result of a failure to observe the product-specific documents. The modification or improper use of products shall extinguish all warranty claims relating to HUBER+SUHNER cable systems.

#### 4. RADOX® EV-C cable system

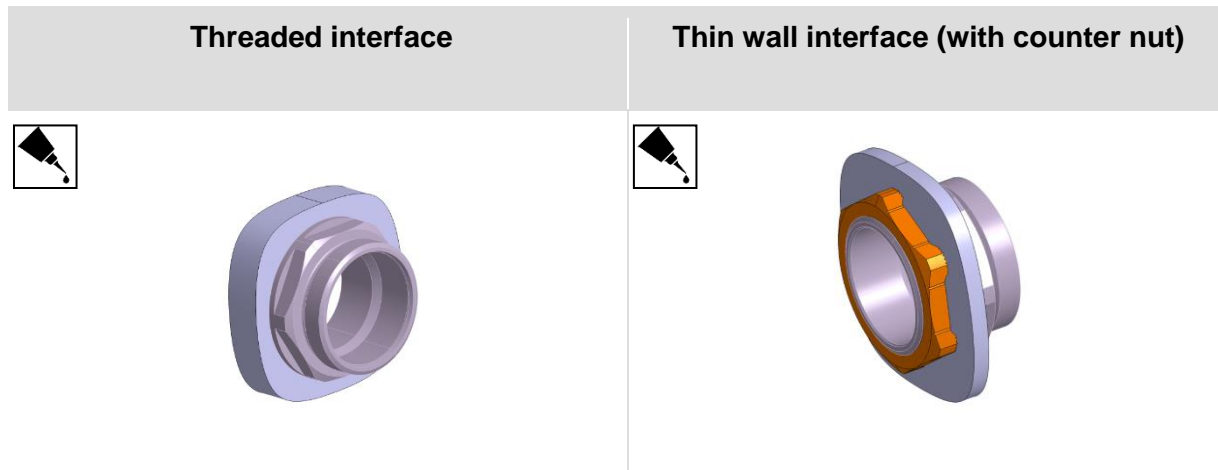
Description	Picture
<p>RADOX® EV-C cable system, validated with high voltage cable</p>	
<p>Cable gland socket, including O-ring</p>	
<p>Counter nut (optional for thin wall variant)</p>	

**5. Installation instructions**

5.1 Clean all threads from grease and contaminations and fix the cable gland socket into the interface. Apply **Loctite 243** on the thread to secure proper fixation.



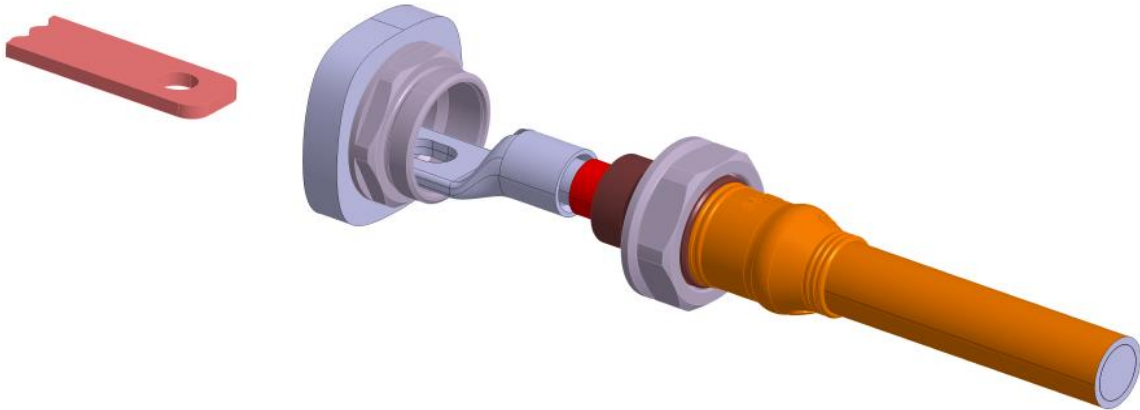
5.2 Before mounting of the cable gland socket, check if the O-ring on the cable gland socket is placed correctly. Use torque wrench set up on proper values – table 1.



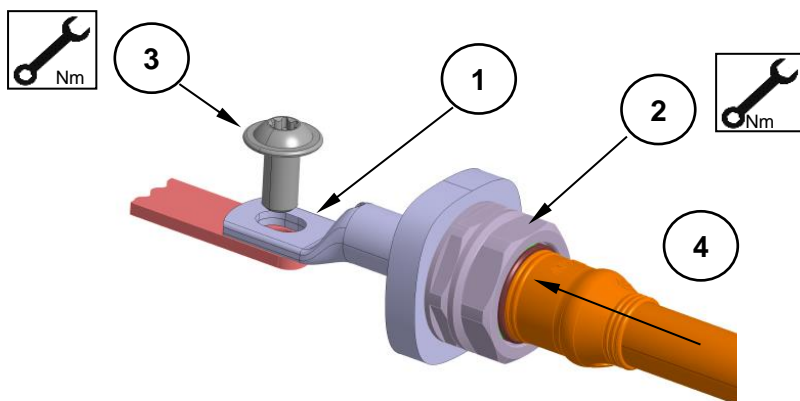
Thread size	Torque Setting [Nm]
M20	15 ± 1.5
M25	15 ± 1.5
M32	20 ± 2.0

**Table 1**

5.3 Insert pre-assembled EV-C into the cable gland socket until it reaches the end position – cable gland socket and cable sleeve are in circumferential contact. This step ensures proper electrical performance. It is also advised to pay attention to the correct orientation and position of the cable lug.



- 5.4 After having checked the correct orientation and position of the cable lug No.1, it is advised to:
- prior to applying the tightening wrench, slide the sealing boot a few inches / cm backwards along the cable in the direction away from the cable gland nut. This prevents damages to the boot caused by the torque wrench.
  - fix cable lug with screw No.3 by hand.
  - use the torque wrench to tighten the cable gland nut No.2, using the correct torque setup according to the table 2.
  - tighten the screw No.3 using recommended torque and in special cases angle controlled tool (customer choice process).
  - at the end of installation - move the rubber sealing boot to its final position No.4.



Thread size	Torque Setting [Nm]
M20	12 ± 1.2
M25	12 ± 1.2
M32	15 ± 1.5

**Table 2**

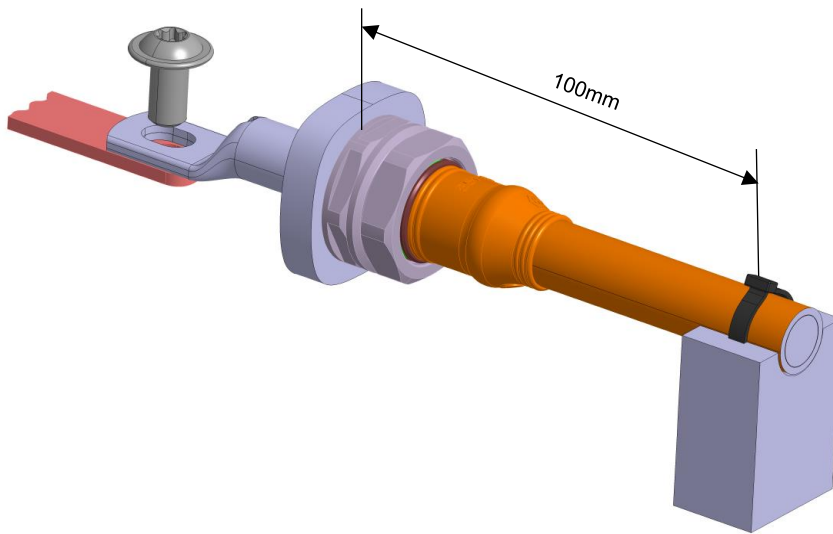
## 6. Installation notes

### 6.1 Strain relief

A strain relief, also called a bend relief, is important to the electrical and mechanical integrity and overall performance of HV cable installation.

Strain relief prevents cable pullout from the point of termination due to tension, vibration, flexure or motion. A properly designed strain relief will prevent mechanical force applied to the exterior of a cable from being transferred to the electrical terminations within the connector which could lead to failure. Strain relief can be either pre-manufactured or custom designed and manufactured for a specific application.

A strain relief or fixation of the cable is recommended to be placed at distance max.100mm from vertical fixation plane.



## 6.2 Cable bending / routing

During installation, cables can be bent or flexed in order to accommodate various environmental conditions such as getting around obstacles and making elevation or directional changes. The minimum bend radius refers to the smallest radius the cable can be bent without degrading performance (including kinking). Cables used in cable system RADOX<sup>®</sup> EV-C, have a minimum bending radius of fixed, 4 x cable D and flexing, 6 x cable D (ref. cable datasheet). In most high voltage applications, a strain relief of the cable is recommended – see point 6.11.

