

Modular junction box system

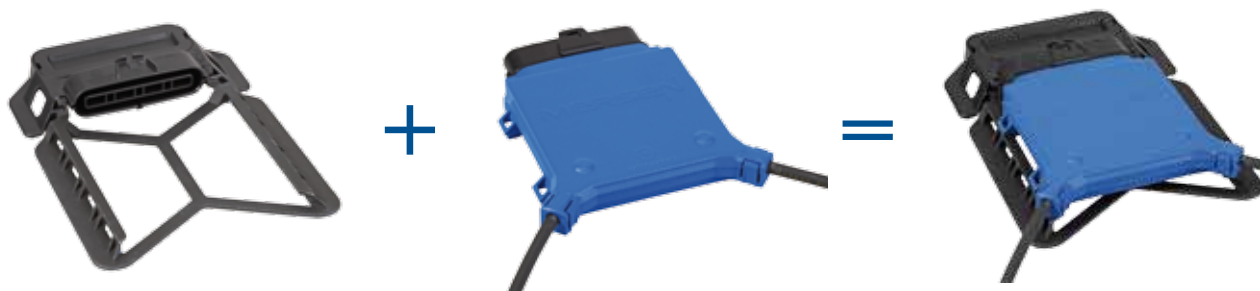
PV product portfolio and services



The modular junction box system by HUBER+SUHNER provides module manufacturers, installers and suppliers of smart electronics a flexible platform that allows them to respond to the diverse needs of their customers.

The modular system consists of a base box, the RADOX® SolarBox HM with a standardised HSI-4 interface that can be equipped or retrofitted with an optional BlueBox at any time. In cooperation with renowned partners, HUBER+SUHNER integrates application-specific smart electronics into the BlueBox. The first intelligent junction boxes for various applications are already part of the HUBER+SUHNER product portfolio.

The modular system



RADOX SolarBox HM base box

BlueBox with smart electronics

Intelligent PV junction box

General features

- Easy-to-maintain modular solution
- Easy to retrofit and interchange the smart electronics
- Easy handling, quick assembly
- For manual and automated manufacturing processes
- Excellent heat dissipation (away from the module)
- Patented thermal separation between box and module
- Maintenance free during the complete life cycle
- Temperature range from $-40\text{ }^{\circ}\text{C}$ to $+85\text{ }^{\circ}\text{C}$

Applications

The modular junction box is installed on the solar module. Depending on customer requirements, the box and its connected generator junction box can be upgraded with smart electronics.

Smart bypass

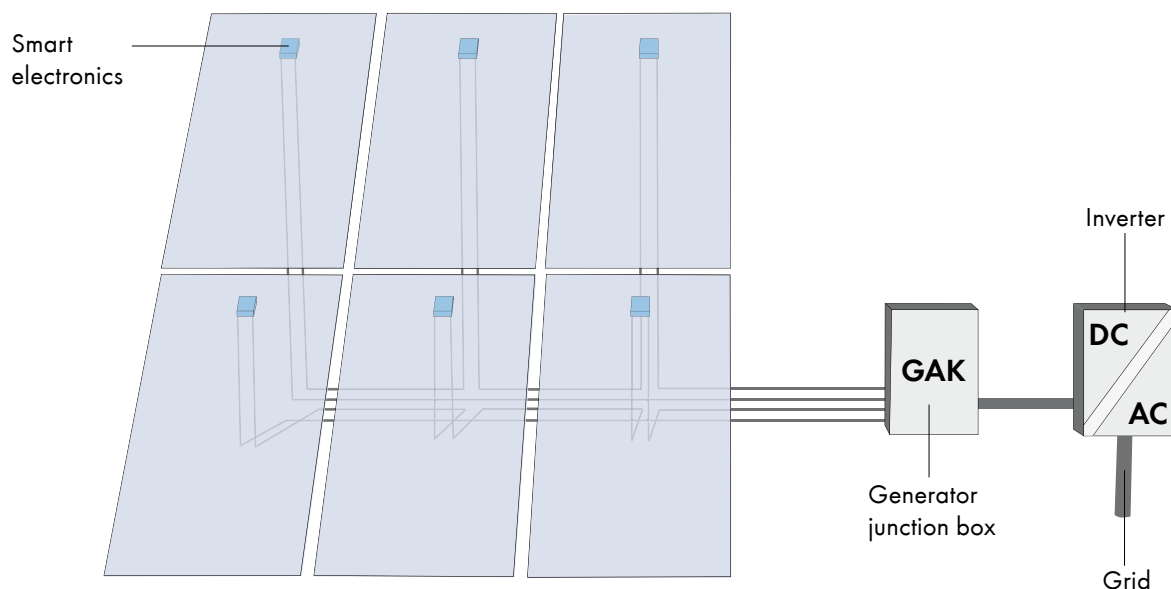
- Junction box with integrated bypass diodes

Fire protection system

- Junction box with shutdown function
- Arc detector and fireman switch in the generator junction box

Inverter modules

- Conversion to AC power directly on the module



The product portfolio

Modular safety system for prevention of fires

The RADOX SolarBox HM-Blue-Safety is part of a safety system. The system allows users to switch modules to a de-energised and currentless state via a master switch for maintenance and repair work. In addition, the fire department can fight fires on the system without the risk of high voltage.

To prevent fires, the safety system also detects arcing on bad connections and faulty insulation in the system's modules or wiring. If it detects an electric arc, the circuit breaker part of the system automatically switches off the individual modules, thus preventing potential damage.



Properties

- Integrated smart electronics with:
 - Shutdown module
 - Sensors for monitoring the voltage, current and temperature of the module
 - Communication via existing wiring

Benefits

- Improved fire protection for PV installations
- Meets future safety standards for buildings, sensitive installations and rooftop applications
- Reduces maintenance costs thanks to real-time performance monitoring of individual modules

System components in the generator junction box

- Controls module shutdown
- Arc detector and fireman switch
- Web server and communication unit

Junction box with integrated micro-inverter

The inverter module built into the RADOX SolarBox HM-Blue-AC allows direct current to be converted into alternating current directly on the module. The resulting AC PV modules can be quickly and easily installed using «plug & play». Moreover, it is possible to combine modules of different outputs and from different manufacturers.



Properties

- Micro-inverter integrated into the junction box
- Direct connection to the power grid
- Allows modules of different outputs and from different manufacturers to be connected
- Maximum Power Point Tracking (MPPT) for each module

Benefits

- Increased reliability and safety thanks to AC architecture
- Easy installation via «plug & play»
- Reduces planning and installation costs
- Reduces maintenance costs thanks to real-time performance monitoring of individual modules

System components in the generator junction box

- Gateway with web server and communication unit

Smart bypass

The RADOX SolarBox HM-Blue-Bypass is the most-basic modular application by HUBER+SUHNER. The junction box integrates three bypass diodes, thus protecting solar cells against harmful reverse currents and hence from thermal damage due to shade or defective cells.



Properties

- Integrated bypass diodes
- Protects cells from harmful reverse currents
- Minimal power loss in bypass mode
- Easily connected to the RADOX SolarBox HM

Benefits

- High reliability
- Maintenance free during the entire life cycle
- Basic solution that supports easy retrofitting with smart electronics

HUBER+SUHNER services

For module manufacturers

- Design-in support for manual or automated manufacturing processes
- Support for PV module certification (TÜV, UL)
- Worldwide shipping of the RADOX SolarBox HM portfolio by local HUBER+SUHNER partners

For suppliers of smart electronics

- Joint development projects in order to integrate application-specific smart electronics in the modular junction box (customer-specific design)
- Support for certification of the RADOX SolarBox HM interface
- Licensing of standardised HSI-4 interface

For distributors and installers

- Application and installation support
- Worldwide shipping of the RADOX SolarBox HM portfolio by local HUBER+SUHNER partners
- Contractual agreement as a preferred distributor for the HUBER+SUHNER RADOX SolarBox HM product portfolio

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