

SIPROTEC 5 - CONFORMAL COATING

Highest availability even in harsh environments

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Discription

The term „conformal coating" refers to the coating of electronic modules. This coating provides protection against extreme moisture, corrosive gases and aggressive dust, or combinations thereof. Furthermore, the coating layer also offers mechanical protection against inappropriate handling and external influences. Conformal coating extends the lifetime of your devices in case of harsh environments.

SIPROTEC devices already feature a high degree of availability and long lifetime, even without additional coating. This is demonstrated by more than 3 million devices in operation worldwide. During the phase of product design, highest priority is given to fulfilling the relevant product standards, and compliance is proven by type tests, e.g. damp heat cycle tests according to IEC 60068-2-30, involving exposure to mixed gases, sulfur dioxide SO2 or hydrogen sulfide H2S.

The new coating feature provides an additional level of protection for SIPROTEC devices used in extremely harsh environmental conditions, such as:

- H2S gas, which is present in certain industrial environments and may impair SMD components alread at concentrations of 10 ppm
- Constant exposure to silver sulfide, which can lead to socalled „silver whiskers" on the surface of SMD components
- These negative influences may be even aggravated by high air humidity

In extreme cases, these influences may cause short-circuits or circuit breaks on the board and lead to restricted device functionality or failure.

Qualified production process

The conformal coating of SIPROTEC device PCBs is carried out in an established, high quality process.

In this process, the PCBs undergo an automated coating with a coating roboter and afterwards a hardening of the coating.

Typ testing of coated PCBs

SIPROTEC protection and automation devices are tested and approved by independent and accredited test laboratories.

In this process, the SIPROTEC device is subjected to several test complexes.

In the course of test complex A, for example, the device is first exposed to corrosive gases and afterwards to damp heat. In contrast to single tests with different specimen, this combined approach simulates maximum harsh environmental conditions.



Extensive environmental and stress testing – ensuring robust performance in extreme conditions

Test complex A:
Corrosive and climatic tests

- Corrosive gas SO2, acc. to IEC 60068-2-42
- Corrosive gas H2S, acc. to IEC 60068-2-43
- Mixed corrosive gases, acc. to IEC 60068-2-60
- Corrosion test with mixed gas, in accordance with
- ISA 71.04:2013-08, G3 (Harsh) (SIPROTEC 5)
- Damp heat, cyclic, acc. to IEC 60068-2-30 and
- LR test specification $ 14

Test complex B:
Climatic and mechanical-dynamic tests

- Temperature: +55 °C continuous, +70 °C for 96 h
- Fast temperature change cycles -40 °C <-> +85 °C acc. to IEC 60068-2-14
- Vibration and shock stress, acc. to IEC 60068-2-6, 60255-21-1
- Damp heat, cyclic, acc. to IEC 60068-2-30

Test complex C:
Hygroscopic dust

- Dust and sand, Arizona test dust, duration 24 h, in accordance with IEC 60068-2-68
- Damp heat, cyclic, acc. to IEC 60068-2-30

Test complex D:
Salt mist test

- Additional specific tests to simulate “Offshore” conditions
- Salt mist IEC 60068-2-52, test Kb with increased parameters acc. Lloyd’s Register Specification

SIPROTEC devices with conformal coating

- 7SJ82, 7SK82, 7SA82, 7SD82, 7SL82, 7UT82, 7SX82, 7SY82
- 6MD85, 6MD86, 7SJ85, 7SJ86, 7SK85, 7SA86, 7SA87, 7SD86, 7SD87, 7SL86, 7SL87, 7UT85, 7UT86, 7UT87, 7VK87, 7UM85, 7VE85, 7KE85, 7SS85, 6MU85, 7SX85, 7VU85

Benefit from the advantages of conformal coating

- Highest lifetime and high availability of SIPROTEC devices even under extreme environmental conditions
- Increased protection against harmful environmental influences such as corrosive gases and salts
- Additional mechanical protection against dust, abrasion and insects
- Reliable prevention of the formation of „dendrites“ between components
- Increased protection of the PCBs against moisture

Highest coating quality by means of a qualified production process.

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