



Rainer Bussmann

## All-Weather Connectors

**HARTING performs outdoor testing to verify its connectors meet all applicable industry standards for reliability.**

**Data and power connectors are being installed outdoors at an ever increasing rate in telecommunications applications. Long-term outdoor exposure places significant demands on reliability, ease of use and maintainability. HARTING conducts a series of tests on its products to ensure that they are able to withstand harsh outdoor conditions.**

More and more data and power connectors are being installed outdoors in current telecommunications applications such as WiMAX, LTE and 3rd generation transmission systems. These applications require a broad range of connectors including rugged power connectors and fiber optic connectors.

For example, connectors are installed on the link between the outdoor Remote Radio Head (RRH), which is attached to the mast, and the base station (Node B). In this example, the connectors not only have to support mobile deployment, but they also have to guarantee dependable, fault-free transmission for 15 years or more under harsh conditions. Outdoor connectors must be easy to install and remove without placing any limitations on their use or reliability, even harsh weather conditions. Frost, snow, continuous rainfall, dust, extended exposure to sunshine, heat and periods of dry weather have an effect on materials, assembly and handling, and this must be taken in consideration during the design phase.

HARTING's All-Weather connectors call for both an operational reliability and ease of maintenance criteria which place significant demands on their product design teams to resolve these often conflicting requirements. The task of HARTING engineers is to reconcile these conflicts that arise. HARTING conducts exhaustive outdoor testing

to verify the functionality, reliability and maintainability of the solutions.

### THE HARTING OUTDOOR RANGE

Reliable, resilient HARTING outdoor solutions are built around IP 65 and 67 housings which have a proven track record in field applications. The HARTING product family for outdoor telecommunications applications is based on these housings, offering solutions for

- power distribution with conductor cross-sections up to 3 x 10 mm<sup>2</sup>
- copper-based data transmission, e.g. RJ45
- optical fiber using the standardized LC duplex mating face
- hybrid data/power distribution (copper or fiber optic based).

An efficient test procedure has been developed to verify the performance of HARTING outdoor solutions. The design of these solutions are based on and subjected to an extended series of complex tests which simulate actual field conditions to assess the suitability of the products for outdoor applications.

The HARTING Technology Group's central lab (CTS Corporate Technology Service) develops the complex and extremely demanding test profiles and conducts the



tests. Extensive effort is needed to define test parameters because international standards bodies have been reluctant to define mandatory test criteria for outdoor connectors. This is understandable, because there is huge variation in climatic conditions around the world. Outdoor conditions can be extreme and the requirements can be contradictory.

Industry cannot, however, live with the status quo, because the situation is very clear in practical application.

Customers want and expect the industry to deliver solutions for outdoor applications. HARTING is taking a proactive approach and has taken the necessary steps by including a realistic simulation of every conceivable condition in its outdoor test series.

### HARTING TEST SERIES

The HARTING test series includes mechanical, electrical and climatic testing which is divided into two groups. Group A (mechanical and electrical test series) subjects

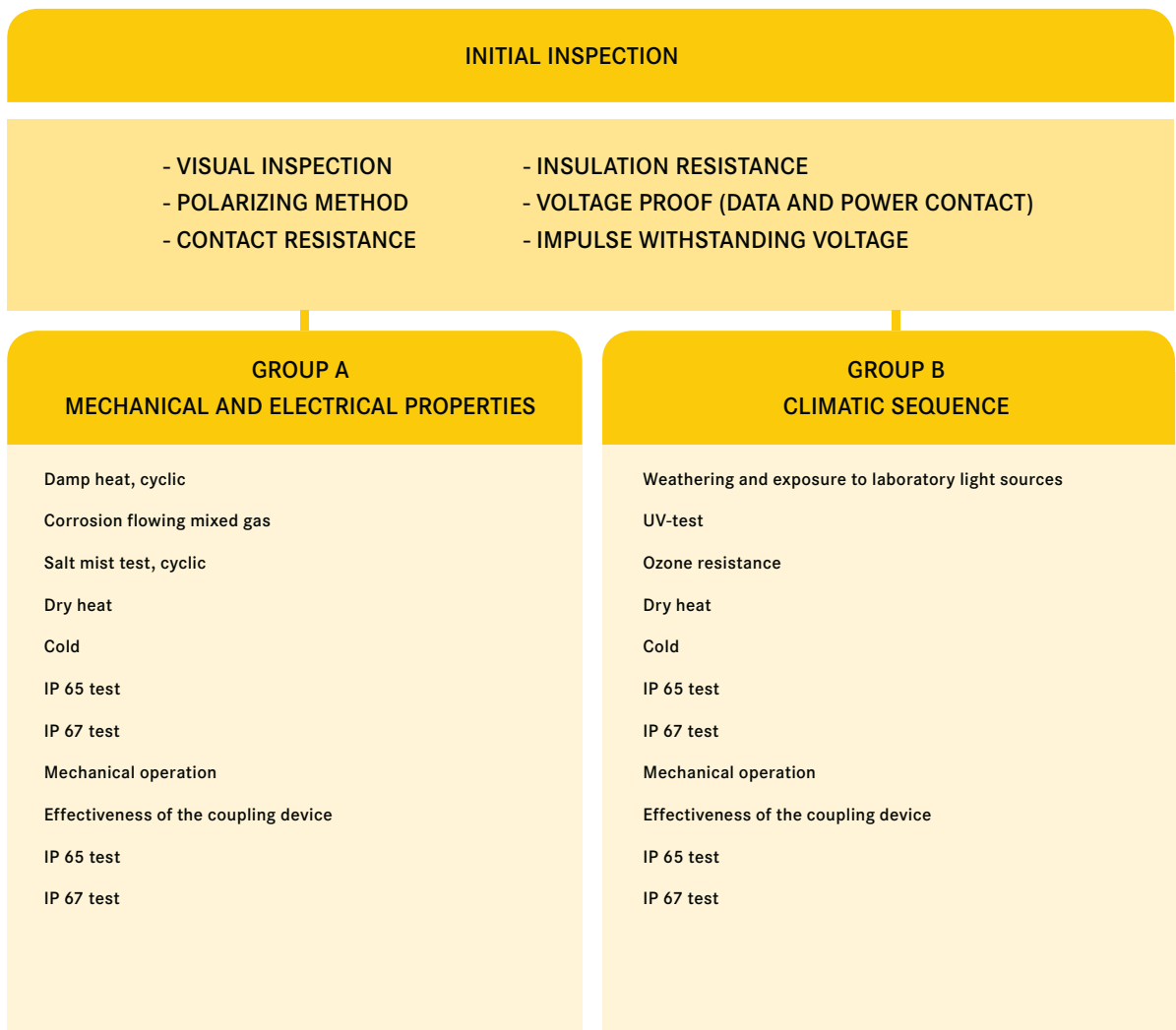


Fig. 1: Overview of HARTING outdoor tests

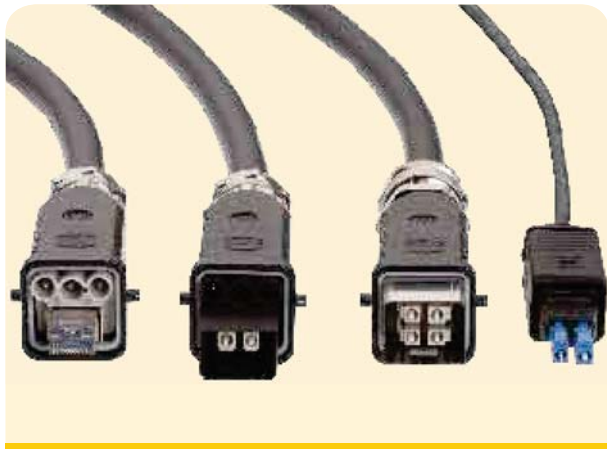


Fig. 2: HARTING Telecom Outdoor Solutions – Outdoor approved

The proper selection of connector housing material is critical to ensure the long-term durability of outdoor connectors. Depending on the application, HARTING enclosures are made of plastic (PA polyamide or PC polycarbonate) or metal (plated zinc die castings or stainless steel). Special attention is also given to the materials which are used for the seals and cable clamps. Ozone and UV radiation can seriously degrade the elasticity of sealing materials. Under expose to extreme sunlight or other weather conditions, many materials become very brittle and reliable sealing is no longer guaranteed. Suitable materials must be assessed during extensive testing to ensure that this



Fig. 3a: Porous standard seal after ozone/UV test



Fig. 3b: Special outdoor seal, still in good condition following ozone/UV test

the items under test to various levels of low temperature, high temperature, corrosion, salt and vapor. The connectors must continue to function even when they are exposed to extreme stress.

Group B assesses performance during exposure to climatic stress including weather conditions, ozone and UV radiation. Once again, the items under test must continue to function properly under stress. The tests ensure that the items meet criteria that are derived from the IP 65 and 67 protection ratings which are clearly defined. Fig. 1 shows an overview of the HARTING outdoor test series.

does not happen. HARTING has analyzed the test results and incorporated the findings into its product portfolio to ensure that its outdoor solutions deliver the performance that customers expect.



**RAINER BUSSMANN**  
Senior Product Manager  
Telecom Outdoor Interfaces, Germany  
HARTING Technology Group  
rainer.bussmann@HARTING.com