

// ALLIED VISION WARRANTY

Sensor Warranty Terms

This document defines warranty terms for sensor aging and for Taped Cover Glass (TCG) and Removed Cover Glass (RCG) sensor options.

Sensor aging

Most auto manufacturers provide certain warranties, but they clearly distinguish between “power train” (such as engine and transmission) vs. components subject to wear and tear (like tires and brakes).

There are analogies with digital cameras: While the camera housing, electronics functionality, and sensor overall may enjoy a long duration warranty, pixels within the sensor may age with time and cannot be warranted for long durations.

All current sensor technologies, whether CCD, CMOS, InGaAs, Microbolometer focal plane array, or other, present an array of receptors, or pixels, some of which are typically defective or less than ideal, from the time of manufacture, and which further age through exposure to heat, gamma rays, etc. The sensor manufacturer, who is a component supplier to the camera manufacturer, typically specifies a permitted defects standard, such as “x bright pixels in a dark field” or “y dark pixels in a bright field”, even for a new sensor, as well as caveats about aging, making warranty claims very difficult to assert.

Somewhat challenging for camera manufacturers and their customers, many sensor manufacturers impose Non-Disclosure Agreements (NDAs) upon the camera manufacturer, forbidding the camera manufacturer from sharing sensor defect specifications.

Just as with an auto warranty, once the customer has accepted the car and begins driving it, the tires and brakes will never be entirely as new again. So too with sensors, though of course tires, brakes, and sensors can typically be used for long service, if well cared for, and their limitations are understood.



Definition of Terms

1. **Gross sensor failure** – Failure of the sensor's ability, when appropriately parameterized for imaging conditions, to render a well-formed image substantially consistent with the subject, i.e. complete failure, image strongly distorted, or substantial interference relative to industry norms for the same sensor technology and camera type.
2. **Defective pixel** – Bright pixel in a dark field, dark pixel in a bright field, or pixel yielding substantially differing value relative to its immediate neighbors when exposed to the same conditions.
3. **On-camera defective pixel compensation** – Certain camera models may offer a feature such as defective pixel correction (conventional term), which in fact is more accurately defect pixel substitution, optionally (at user's discretion upon enabling and configuring the feature when present) replacing a defective pixel's value with the averaged value of its nearest neighbors.
4. **Host-based defective pixel compensation** – When a camera model does not provide on camera defective pixel compensation, users wishing to avoid images with defective pixels must purchase or develop software that can implement a suitable nearest-neighbor (or similar) pixel averaging and substitution, at their own discretion and expense. Many machine vision software libraries provide such functionality, or the user may develop his/her own software, to achieve the desired outcome.

Sensor aging and warranty

- a. The sensor is warrantied against gross sensor failure for exactly the same term as the camera as a whole.
- b. No sensors are warrantied against defective pixels per se, as they are a normal phenomenon in digital imaging.
- c. For cameras offering on camera defective pixel compensation, that feature is warrantied to perform as specified, for exactly the same term as the camera as a whole.
- d. For cameras not offering on camera defective pixel compensation, it is the obligation of the user to accept the defect pixels or to arrange for host-based defective pixel compensation.

Sensor cover glass options

The Modular Concept offers Taped Cover Glass (TCG) and Removed Cover Glass (RCG) sensor options. These camera variants are used for demanding applications that require:

- Maximized light sensitivity
- Minimized effects by the sensor cover glass due to
 - Reflection
 - Dispersion
 - Varying spectral transmission, for example blocking infrared light
- Mounting fiber optics directly to the sensor pixels (for example).

A sensor with removed cover glass is sensitive to dirt on the surface that cannot be removed and to mechanical impact that destroys microstructures.

Sensor cover glass options and warranty

Allied Vision does not warranty against any damage to the sensor as soon as the cover glass or the circular protection foil is removed.