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Manual Gain Control in Night Vision and Thermal Imaging Devices

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Special points of interest:

- Manual Gain Control in Night Vision
- Manual Gain Control in Thermal Imaging
- Dare to Compare Leading Brands' Quality to GSCI's?

Ability to directly control image gain is a performance-enhancing feature of a night vision or a thermal imaging device. This newsletter will help you to understand the purpose of manual gain control and to see when it is advantageous to have one.

A night vision device equipped with manual gain control enables an operator to manually adjust image brightness to adapt to current ambient light conditions. This feature becomes particularly useful in areas with frequently changing ambient lighting, for example in urban environment. Furthermore, ability to control output image brightness helps reduce or completely eliminate the so-called "night blindness effect". This problem is common in night vision monocular systems and caused by brightness difference perceived by naked and "night vision equipped" eyes in a dark environment.

Being a MIL-SPEC option, the manual gain control is highly desired by military and law-enforcement Professionals.

The principle of manual gain control in thermal imaging is different from that in night vision. Besides the simple changing display's *brightness*, the manual gain control in thermal imaging systems controls *FPA' sensitivity*. Since the amount of ambient light has little effect on a thermal image, having a manual gain control in a thermal imager is highly desirable for any application/environment. The image below illustrates the difference between low and high sensitivity levels in a thermal imaging device.



The difference between minimum and maximum brightness levels in a night vision device.



Now imagine, for example, an environment with uniform ambient temperature: a forest early in the morning. Operating in these conditions, you would need to **increase FPA sensitivity** to better distinguish temperature difference of surrounding objects. On the other hand, in the environment with temperature-contrasting objects (very hot and very cold), one may need to **reduce FPA sensitivity** to level out displayed image and achieve the best image perception.

Dare to Compare?

Yet another “Dare to Compare” newsletter has landed to your e-mail inbox. This time we put our efforts to clarify the idea of a manual gain control in electro-optical devices and hopefully this will help you make the right choice.

We always encourage everyone to compare quality and characteristics of GSCI night vision and thermal imaging systems to those from the next leading brands.



Links to previous GSCI newsletters:

1. [F-number Explained](#)
2. [Image Quality in Thermal Imaging: Resolution](#)
3. [Image Quality in Thermal Imaging: Sensitivity](#)
4. [Image Quality in Thermal Imaging: Refresh Rate](#)
5. [Deciphering Figure of Merit \(FOM\) in Night Vision](#)
6. [Thermal Image: Black-and-White or Colour?](#)

References:

1. [Organizational and Direct Support Maintenance Manual for Viewer, Drivers, Night Vision \(Google eBook\)](#)
2. <http://en.wikipedia.org/wiki/Gain>
3. http://en.wikipedia.org/wiki/Automatic_gain_control



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