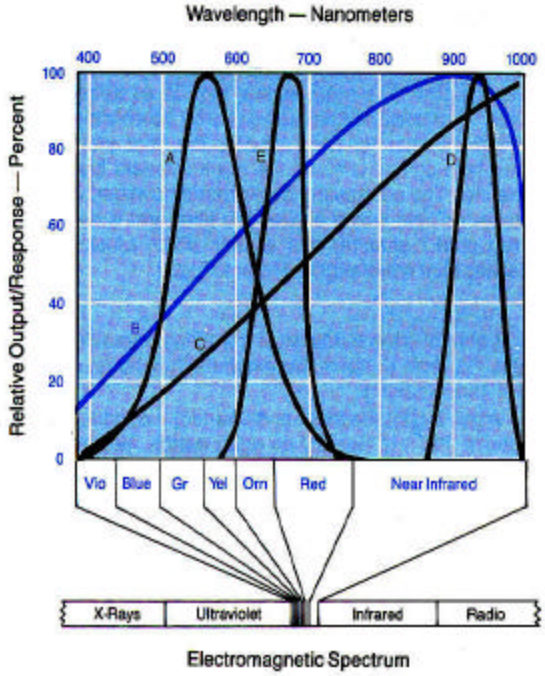
SKAN-A-MATIC®

CLAROSTAT SENSORS AND CONTROLS GROUP

Components of a Photoelectric System

Photodetectors



A Human Eye
B Photodetector
C Lamp
D I R LED
E Visible red LED

FIG. 1A

Features

- No Filament - Resistant to shock & vibration
- Ten times longer operating life than lamps—100,000 hours (11½ years of continuous operation)
- Can be modulated

Limitations

- Lower output than lamps - limits distance and response time
- Can be damaged by incorrect wiring

Most Skan-A-Matic products use silicon phototransistors to detect light. Like normal signal transistors, they act as valves or switches to regulate the flow of current in a circuit. When light is absent the phototransistor is OFF and conducts only a very small DARK CURRENT. Light striking the transistor turns it ON so that it conducts LIGHT CURRENT. This catalog uses the general term PHOTODETECTOR CURRENT.

As Fig.1A shows, photodetectors respond to light of many wavelengths — from visible blue thru red to the invisible infrared. Notice that the peak of the photodetector response curve lies out in the infrared near the peak emission of LED's and incandescent lamps. This coincidence makes it easy to get a good match between emitter and detector devices and has been a major factor in the present widespread use of photoelectrics.

Optical Filters

The fact that photodetectors respond to such a great range of wavelengths makes them vulnerable to interference from all sources of light, especially sunlight and room lighting. Skanners which will normally be exposed to light from these sources should be protected by optical filters which block visible light but allow the infrared wavelengths to pass. These infrared-passing filters can be made of glass or a plastic material. The glass filters can be used as an exterior cover glass and can withstand elevated temperatures. The plastic filters can only be used within a protective housing and are temperature-rated to only 50°C.

Optical filters are highly effective against light from fluorescent tubes since this light is almost all in the visible portion of the spectrum. If infrared energy from sunlight or incandescent lamps will be encountered, a modulating control should be used.

Colors

Black marks against a light background are usually easy to detect; however, skanners often have trouble distinguishing between colors which humans perceive as very different. There are two major reasons why skanners are color-blind. First, a skanner uses a single phototransistor controlling a single electrical circuit. The human eye, in contrast, has thousands of specialized cells each responding to slightly different portions of the spectrum. Second,