Grounding, Shielding, and Noise

Electrical noise is probably the most persistent problem faced by industrial users of photoelectric devices. All the engineering and design effort put into these products can be defeated by improper installation.

This type of problem results from the very low currents flowing in the photodetector circuit. These microamp currents can be disturbed by noise carried along the power supply lines or radiated thru the air. The noise is generated by electrical equipment turning motors on and off, from clutches and brakes, relays and solenoids. The best way to deal with electrical noise is to suppress it at the source .Ideally, each potential noise generator would be fitted with its own suppressor.

Individual photoelectric systems can be protected against noise by following some basic installation rules:

- Be sure to connect the cable shield around the red and black wires to the control's Ground connection.
- Connect the control's Ground terminal to machine frame Ground, or electrical service Ground.
- Keep wiring runs between skanner and control as short as possible.
- Never run photoelectric wiring alongside or in a conduit with AC power supply lines.
- Connect the skanner body to machine frame Ground.

Users planning long wire runs should keep several points in mind:

- Use shielded cable
- Keep the photodetector current as high as possible
- Keep the line resistance down
- Consider using conduit when noise is severe

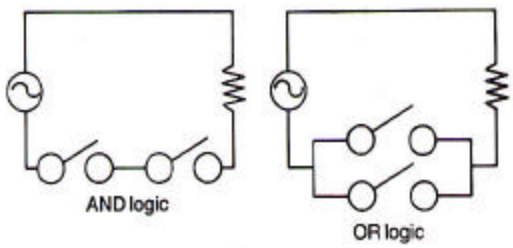
Logic Operations

Never try to use more than one skanner on a standard control. Neither the skanners nor the controls are designed for this sort of "front-end" logic; the attempt will probably fail and possibly damage the units.

Switched outputs from several controls with similar outputs can be tied together to perform OR and AND logic functions (Fig. 24). This is a convenient, safe way to do these logic operations but, again, one control is connected to only one skanner.

In multiple skanner systems the user often would like an output voltage if (A) any skanner sees a target (an OR function) or (B) if all skanners see a target (an AND function). Either can be done with the open collectors of two or more amplifiers tied together through a common load resistor to the desired power supply. This function may also be accomplished with a relay in place of the resistor load.

(A) for OR operation, connect each skanner so that when it detects the target, its amplifier is energized. Connect the amplifier outputs together as in Fig. 25. If any one skanner causes its amplifier to energize, the output voltage goes to zero.



AND/OR Relay Logic

FIG. 24