Photodetector current can sometimes be estimated closely enough to indicate whether a reflective skanner will perform reliably or not. Remember that Optimum Distance and Maximum Usable Distance are measured with a white test card which reflects 90% of the light striking it. Due to light scattering by the paper fibers, much of this energy is not captured by the photodetector. Rough, irregular, or dark surfaces will scatter or absorb more light than the test card. In these cases a skanner may be limited to a range much shorter than the Maximum Usable Distance. Smooth, shiny surfaces such as metals and plastics may be detected far beyond the Maximum Usable Distance if the surface is perpendicular to the skanner's optical axis and acts as a mirror.

A typical target must fill a large fraction of a reflective skanner's viewing area to allow the photodetector to capture enough light. If the skanner cannot be close enough to the target so that the width of the target is at least one-third of the skanner's Field of View, a thrubeam or retroreflective mode should be used.

Choosing a Thrubeam

Match the Beam Diameter to the width of the target; the target should be at least one-third as wide as the listed Beam Diameter. Large targets will be detected by thrubeams with large or small Beam Diameters, but small targets will require a small Beam Diameter. Thrubeams are listed in the catalog in order of their Beam Diameters. Beams that are too large can be eliminated immediately and attention can be focused on the Rated Separation, Light Source, and Body Style of the remaining choices.

Model #	Beam Diameter (inches)	Rated Seperation (inches)
L33/P33	.16	36
L30/P30	.06-.12	3-24
L11/P11	.10	2
L34/P34	.06	6
L56/P56	.03	.5

FIG. 20

Thrubeam Example

Consider the problem of detecting quarter-watt resistor bodies. Assume that the resistors are counted within enclosed machinery where ambient light is not a problem, but that vibration is continuous and severe. The beam must cross a space of 2 inches.

First determine what will be required of the control. Because ambient light or long ranges are not factors, there is no need for a modulating control and a lower-cost conventional control can be used. Assuming the control must interface with an electronic counter and that AC line current is the most convenient power source, The T40300 (standard AC control with open-collector output) is probably the best choice.

Experience shows that a thrubeam should have a Beam Diameter no more than 3 times the width of the target. In this case the target width is the resistor diameter, .090 inches, so the thrubeam should have a Beam Diameter of .270 inches or less.

Max. Beam Diameter = 3 x Target width
= 3 x .090"
= .270"