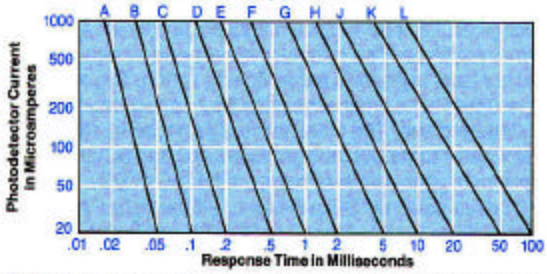
Components of a Photoelectric System

SENSOR/AMPLIFIER RESPONSE DATA *The table below denotes which curve applies to a particular sensor/amplifier combination. Each curve gives the combination's response, assuming a known photodetector output. Since some skanners and photodetectors cannot attain the current levels at the top of the curves, their catalog pages should be consulted for maximum output.*

Sensor/Amplifier Curve Reference and Typical Response Time in Milliseconds

DEVICE	AMPLIFIER			
	STANDARD		HIGH SPEED	
	CURVE	TIME	CURVE	TIME
P11XXX	G	—	D	—
P30XXX	F	—	B	—
P31XXX	F	—	C	—
P32XXX	F	—	C	—
P33001	G	—	D	—
P34XXX	F	—	C	—
P56001	J	—	F	—
S11XXX	F	.5	C	.08
S12001	G	1.0	D	.10
S13XXX	F	.8	B	.05
S14XXX	F	.8	C	.10
S15XXX	F	.8	B	.05
S17103	G	1.0	D	.10
S17104	J	5.0	F	.50
S17105	K	10.0	F	1.00
S19XXX	F	1.0	B	.08
S20001	G	1.5	E	.40
S22XXX	G	3.0	D	.40
S27XXX	F	.6	B	.04
S28XXX	F	.8	C	.10
S3XXX1	F	.6	B	.04
S3XXX4	F	.6	B	.04
S35201	H	30.0	D	1.50
S35202	H	3.0	D	.30
S35203	H	3.0	D	.30
S51XX1	G	1.5	D	.20
S51XX4	J	7.5	F	.80
S56XX1	G	2.0	D	.25
S56XX4	J	8.0	F	1.00
S58XXX	H	5.0	F	.90

Sensor/Amplifier Response Curves



All data is approximate and assumes a sensor operating at its optimum distance, with a target at least as wide as its full field of view and with at least 5:1 light to dark ratio. Since controls with relay or solid state relay outputs have inherent speed limitations, only those with transistor outputs apply in this data. FIG. 4

pot by the photodetector current. When the voltage across the pot reaches a certain threshold, the circuit changes the state of its output. The Schmitt trigger also has hysteresis; that is, the op amp output turns ON at one threshold voltage, but turns OFF at a lower voltage. Hysteresis stops the output from "chattering" (changing state rapidly) when the input signal is noisy.

The amplifier output voltage controls the actual switching device either directly or through a transistor. Because these photoelectric amplifiers have only two output values, they are suitable only for presence/absence sensing and cannot be used for such applications as measuring distances or gray scale values.

Response Time

Response time is the delay between the appearance of a target and the change of output. Response time is a function of the entire system — skanner, amplifier, and output device. Skanner response time decreases as Light Current and the Light Current/Dark Current ratio increase. Skanners with wide Fields of View generally have faster response times since their optics capture more light. When fast response time is required, controls with open collector outputs should be used. For customers who can sacrifice noise immunity in favor of response time, Skan-A-Matic also offers a high-speed control, the T41300.

Output Devices

Some Skan-A-Matic controls can be ordered with any one of three output devices — open collector transistor, relay, or solid state relay.

Open Collector Transistor An open collector transistor has an "uncommitted" collector lead — the collector side of the transistor will "float" until the user makes some connection. The output transistors used by Skan-A-Matic are NPN types, so they must be forward-biased by connecting a source of positive DC voltage to the open collector lead through a "pull-up" resistor or load resistance. Check the maximum voltage and current ratings given for each product before making connections.

The output of an open collector control is simply the voltage level on the collector and it can have only two values. As an example, assume that a reflective skanner and control are wired for "Light Energize". When no target is present, no light is reflected to the photodetector and current flowing in the photodetector circuit is very small. The voltage developed across the sensitivity pot remains below the threshold so the amplifier stays OFF. No current flows into the base of the output transistor so it is also OFF and acts as an open switch. When the output transistor is