#### **Incremental Encoders**



### **Incremental Encoders**

- Encoders typically run on +5V, not +24V
- Outputs are typ. not 24V compatible either





## **Absolute Encoders**

- doubling resolution requires adding another photodiode/LED pair
- cost is much higher than incremental
- does not require seeking to establish reference location



## hybrid incr/absolute encoders

- add more information to index channel to reduce amount of seeking required to find reference position.
- interface requires lots of wires (parallel) or a special comm. protocol



### Potentiometer

 A potentiometer (or pot) is a variable resistor wired to obtain a variable DC voltage proportional to position



### **Magnetostrictive Pos. Sensor**



- Pulse sent down magnetostrictive material
- Pulse reflects off position magnet's field
- Position is proportional to t<sub>rcvd</sub> t<sub>sent</sub>
- Pulse propagates at ~2800 m/s
- Resolution is ~.001" with  $t_{update}$  ~1msec/in.

#### **Magnetostrictive Sensor**



### **Proportional Control with the PLC**

- High Speed Input
- Pulse Output
- PID control

### **PLC Input/Output Timing**



### **PLC Input/Output Timing**



# **High Speed Input/Output**

- High speed counters
   Use XO,X1, and X2
- Pulse Output

   Uses YO and Y1
- One of six modes can be used
  Mode 10: High speed counter
  Mode 20: Quadrature counter
  - Mode 30: Pulse Output
  - Mode 40: High speed interrupt
  - Mode 50: Narrow pulse capture
  - Mode 60: Narrow pulse reject (normal mode)



8 Discrete Inputs

- Up counter, counts to 99,999,999
- Up to 5kHz input rate (incr. on XO low->hi)
- Count is compared to preset values to generate events.
- Reset can be X2 or ladder logic



Used for applications like cut-to-length





 Setup consists of writing values to several special memory locations

nput	Configuration Register	Function	Hex Code Required	
X0	V7634	Counter Clock	0001	
X1	V7635	Filtered Input	xx06, xx = filter time 0 - 99 ms (BCD)	
X2	V7636	Counter Reset (no interrupt)	0007* (default) 0207*	
		Counter Reset (with interrupt)	0107* 0307*	
		Filtered Input	xx06, xx = filter time 0 - 99 ms (BCD)	

Preset	Preset V-memory Regis- ter	Special Relay Number	Preset	Preset V-memory Regis- ter	Special Relay Number
1	V2321 / V2320	SP540	13	V2351 / V2350	SP554
2	V2323 / V2322	SP541	14	V2353 / V2352	SP555
3	V2325 / V2324	SP542	15	V2355 / V2354	SP556
4	V2327 / V2326	SP543	16	V2357 / V2356	SP557
5	V2331 / V2330	SP544	17	V2361 / V2360	SP560
6	V2333 / V2332	SP545	18	V2363 / V2362	SP561
7	V2335 / V2334	SP546	19	V2365 / V2364	SP562
8	V2337 / V2336	SP547	20	V2367 / V2366	SP563
9	V2341 / V2340	SP550	21	V2371 / V2370	SP564
10	V2343 / V2342	SP551	22	V2373 / V2372	SP565
11	V2345 / V2344	SP552	23	V2375 / V2374	SP566
12	V2347 / V2346	SP553	24	V2377 / V2376	SP567



