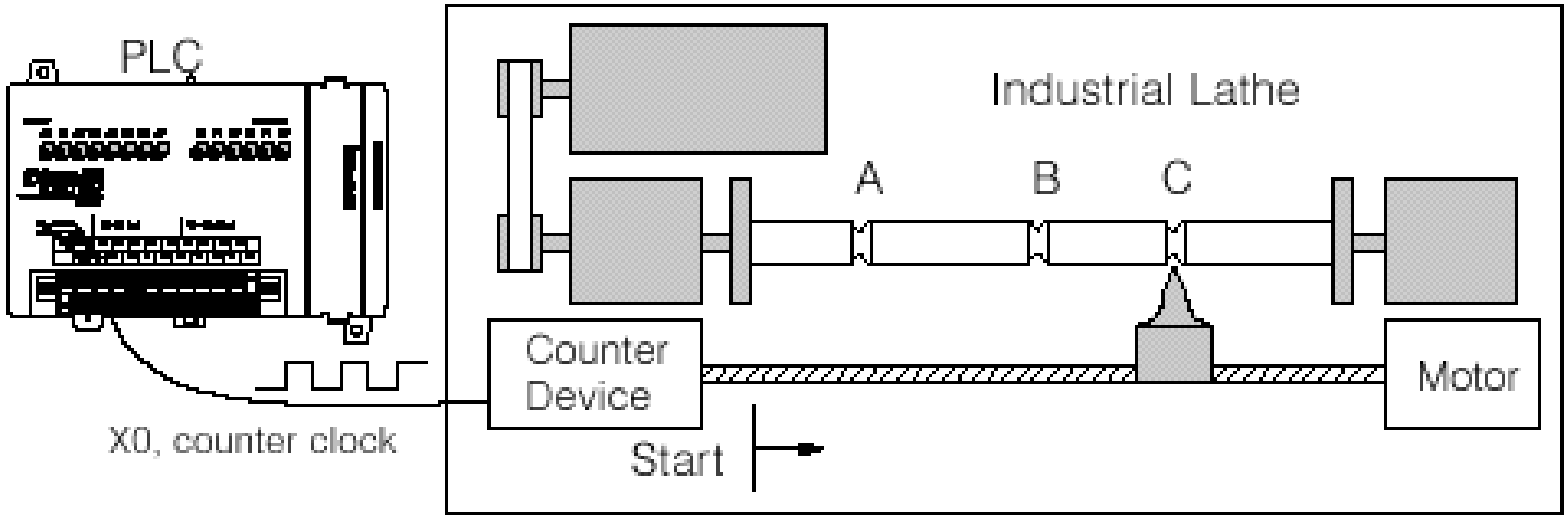
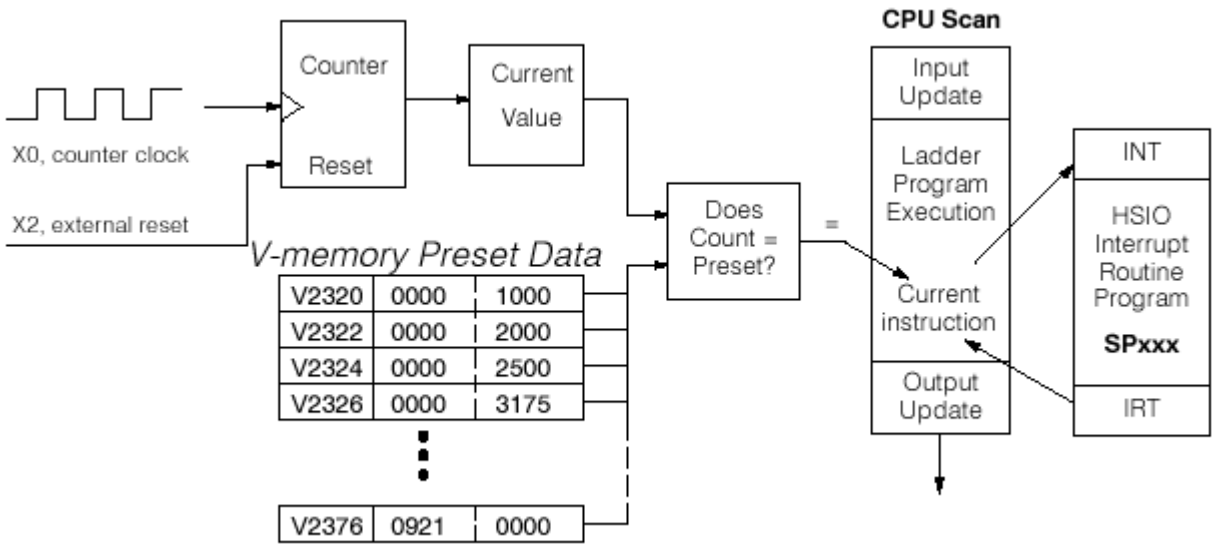
Mode 10 high Speed Counter





Mode 10 high Speed Counter

- *Setup consists of writing values to several special memory locations*

Input	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)

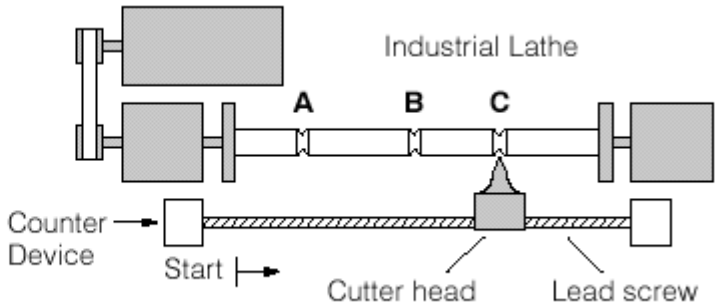
Preset	Preset V-memory Register	Special Relay Number	Preset	Preset V-memory Register	Special Relay Number
1	V2321 / V2320	SP540	13	V2351 / V2350	SP554
2	V2323 / V2322	SP541	14	V2353 / V2352	SP555
3	V2325 / V2324	SP542	15	V2355 / V2354	SP556
4	V2327 / V2326	SP543	16	V2357 / V2356	SP557
5	V2331 / V2330	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

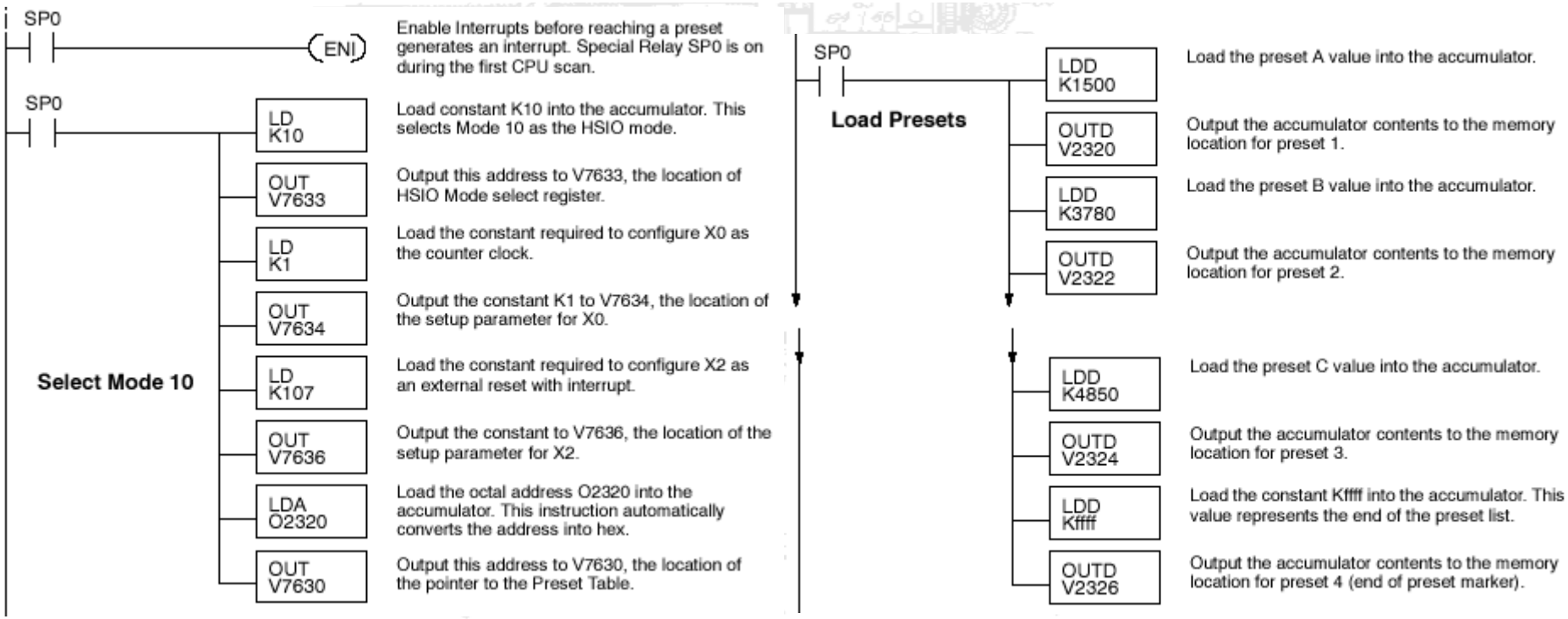
Mode 10 high Speed Counter

Preset Data

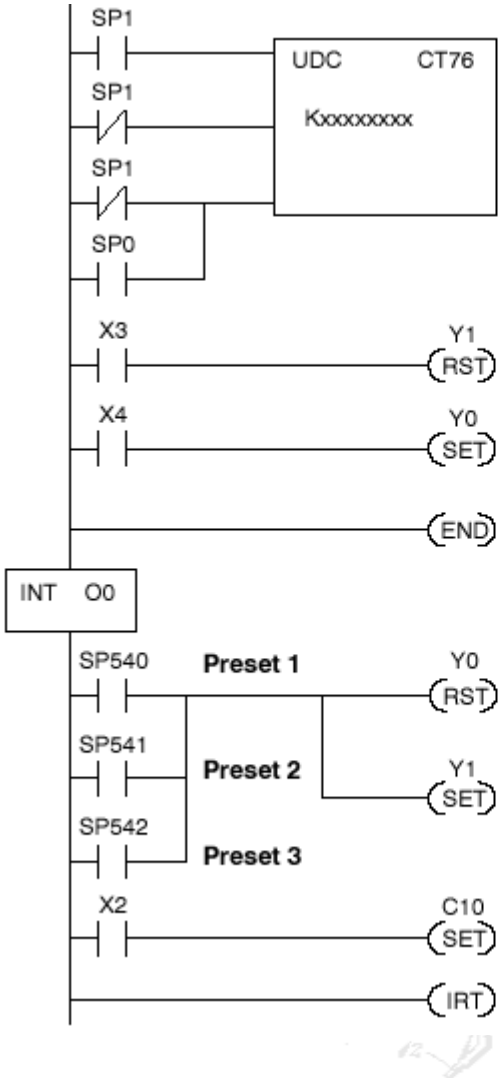
A	V2320	0000	1500
B	V2322	0000	3780
C	V2324	0000	4850
	V2326	0000	FFFF

I/O Assignments
X3 - Cutter head extended
X4 - Cutter head retracted
Y0 - Lead screw motor
Y1 - Cutter head solenoid





Mode 10 High Speed Counter



CT76 is the HSIO counter. The first rung's SP1 always enables the counter. The dummy input in the middle is off (unused in this example).

The third rung's Reset input is normally off, because we will use the external reset. You can optionally reset the counter value on each powerup using the SP0 contact.

Input X3 energizes when the groove has finished cutting. So, we retract the cutter head.

Turn lead screw on again, after cutter head has retracted.

END coil marks the end of the main program.

The INT label marks the beginning of the interrupt service routine program.

Inside the interrupt service routine, we turn OFF the lead screw motor immediately.

These special "equal" relays turn on individually as the corresponding preset is reached. In this application, each results in the cutting of a groove (Y1), so they are logically ORed together.

Input X2 will be energized inside the interrupt routine if X2 external interrupt was the source.

Return from the interrupt service routine.

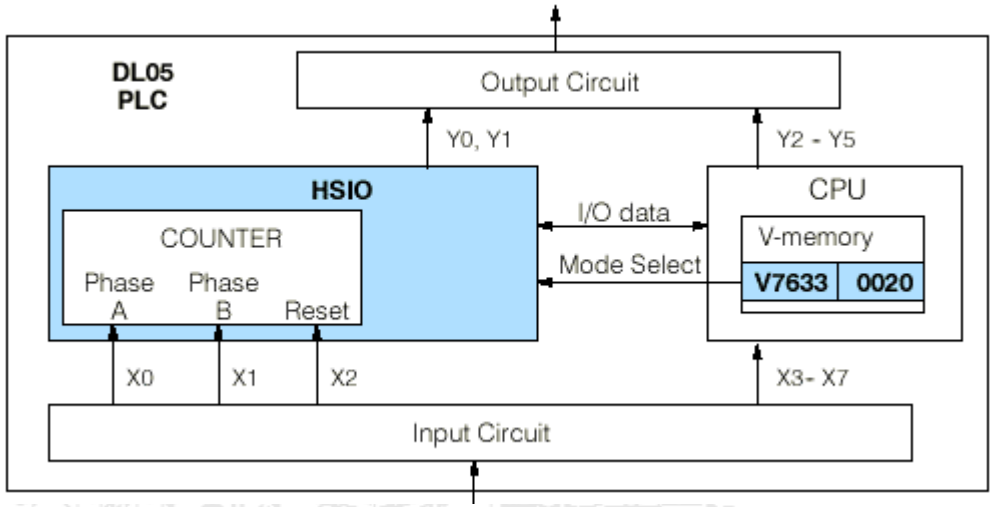
Troubleshooting Mode 10

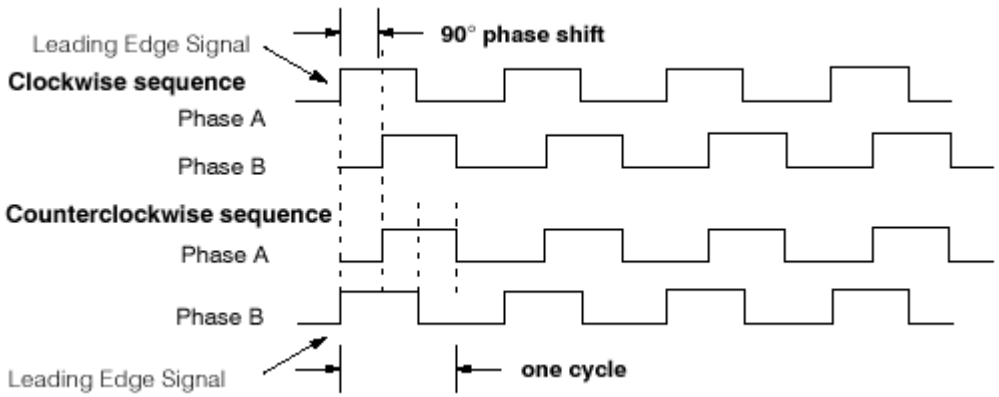
- *Won't count:*
  - *check ladder logic (using CT76?)*
  - *check wiring and signals (sinking/sourcing, pulse width)*
  - *check reset input status*
  - *check parameters (use Data View)*
- *Presets don't do anything*
  - *check preset values (BCD, correct addresses)*
  - *check interrupt routine (int #0, enabled at start, int rtn at end of ladder)*
  - *check special relay numbers*

Troubleshooting Mode 10

- *Counts, but won't reset*
  - *check reset input or internal reset logic*

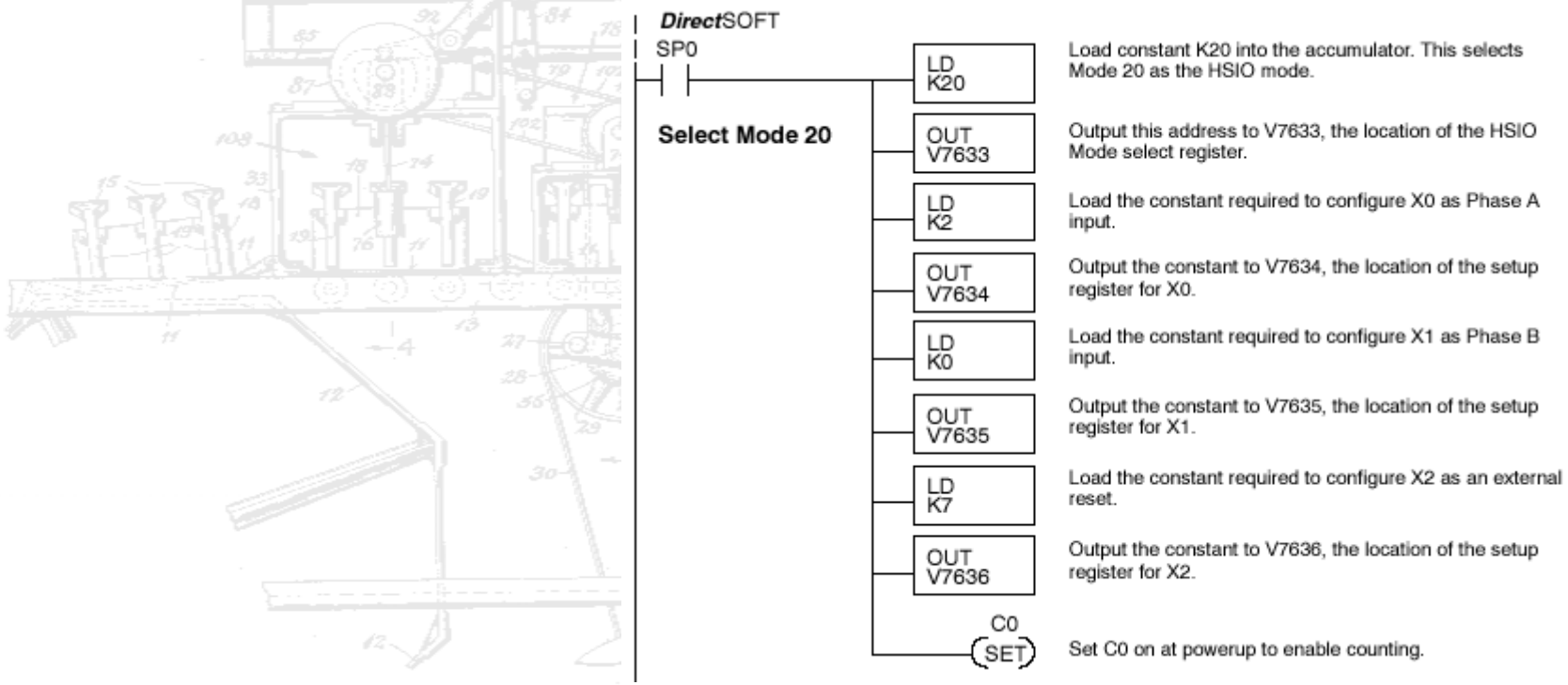
Mode 20 Quadrature Counter



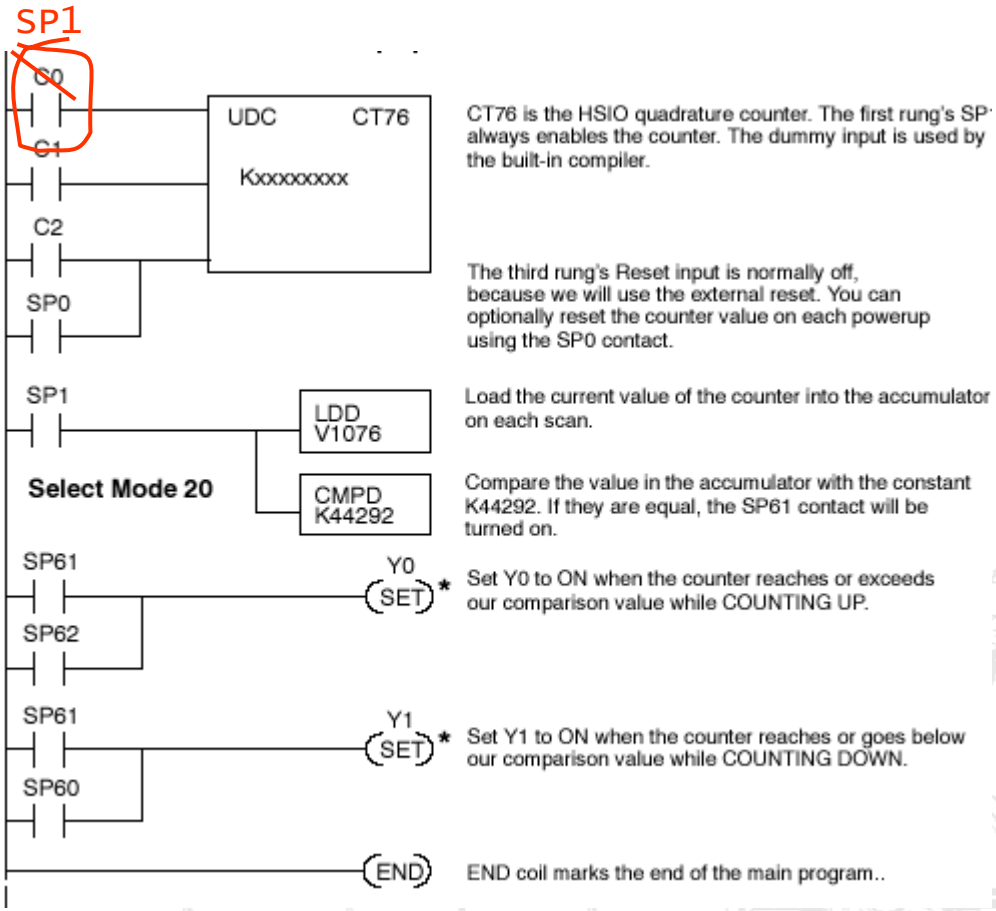


Mode 20 Configuration

Input	Configuration Register	Function	Hex Code Required
X0	V7634	Phase A	0002 (default) quadrature, absolute 0 to 99999999
			0012 quadrature, absolute -8388608 to 8388607
X1	V7635	Phase B	0000
X2	V7636	Counter Reset (no interrupt)	0007
		Discrete filtered input	1006

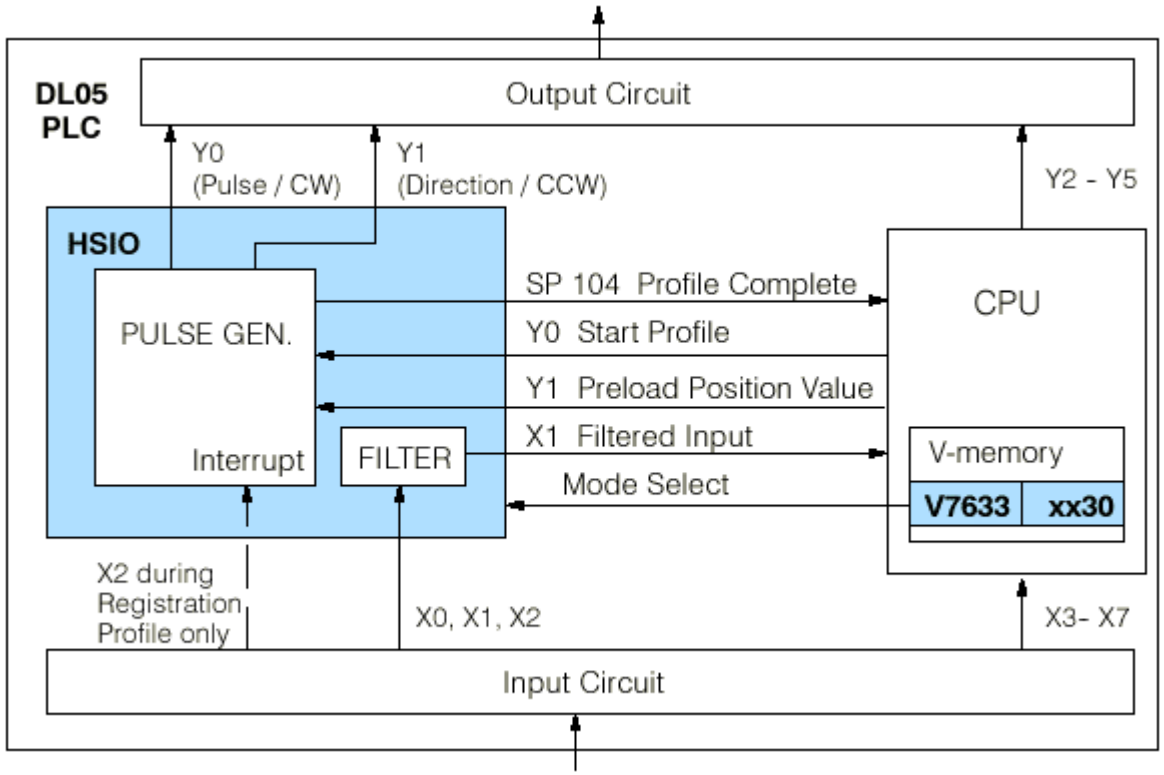


Mode 20 Logic



Mode 30 Pulse Output

Outputs pulses for position or velocity control and a direction signal.

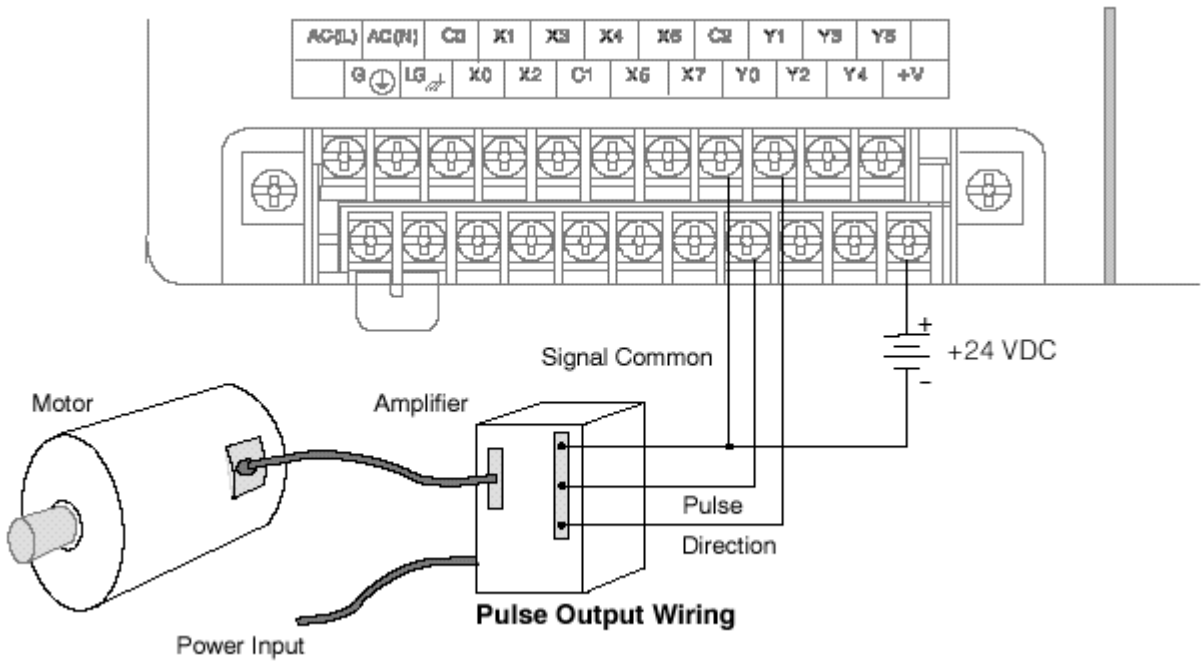


Mode 30 - Profiles

- *Any motion starts from rest and ends at rest, requiring a velocity (and possibly acceleration and jerk) profile.*
- *The DL05 can provide:*
  - *position control (open-loop)*
  - *velocity control (no position tracking)*
  - *registration control (velocity mode until interrupt, then position control)*

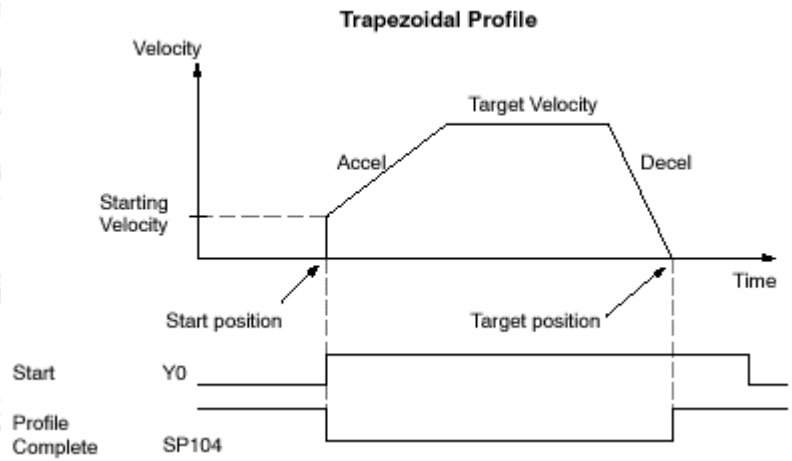
Mode 30 - Wiring

Y0=pulse Y1=direction



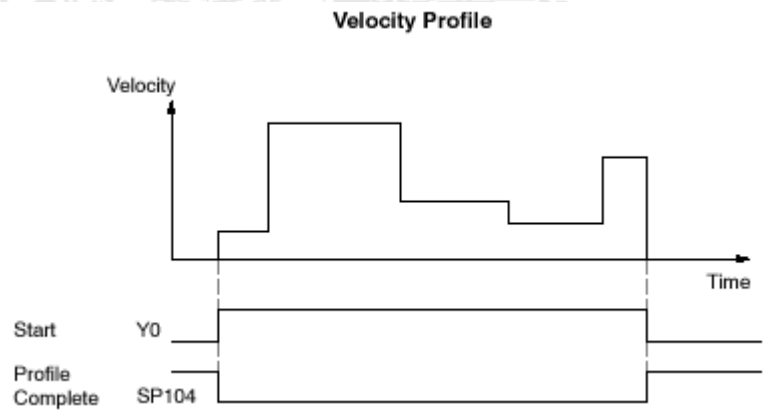
Position Control

- *"Trapezoidal" profile*
- *40pps starting velocity*
- *constant acceleration*
- *target constant velocity*
- *constant deacceleration*



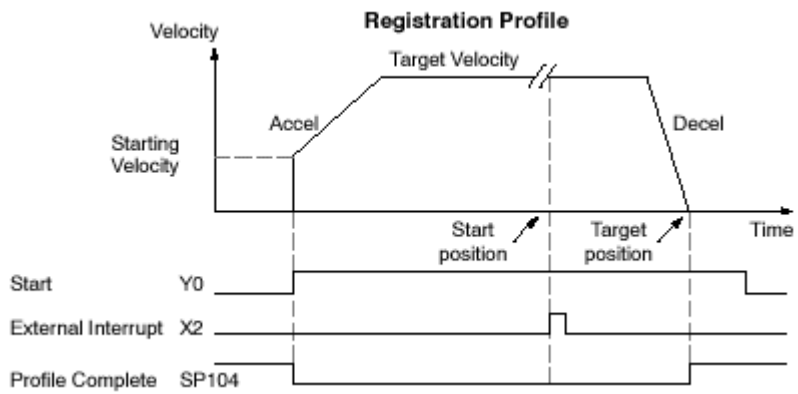
Velocity Control

- *Profile is simply constant velocity segments as a function of time*



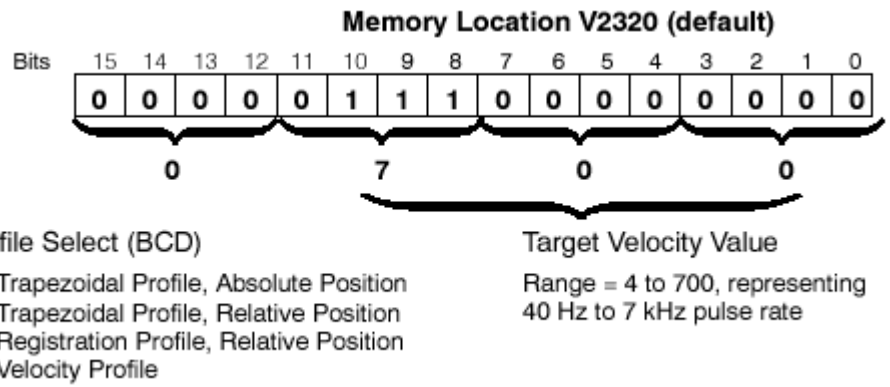
Registration Control

- *Start velocity of 40pps*
- *Constant acceleration*
- *Target velocity without position tracking until interrupt*
- *At interrupt, current position is set to 0*
- *Constant velocity continues, then constant deacceleration to final position*



Mode 30 Setup

- *V7630 set to K30*
- *V7637 set to K0103 (Y0=pulse, Y1=direction)*
- *V2320 sets profile type and target velocity*



- *V1076/7 (CTA76/77) contains current position*

Mode 30 Setup

Trapezoidal Profile

V-Memory	Function	Range	Units
V2320, bits 12-15	Trapezoidal Profile	0=absolute, 8=relative	-
V2320, bits 0-11	Target Velocity Value	4 to 700	x 10 pps
V2321/ 2322	Target Position Value	-8388608 to 8388607	Pulses
V2323	Starting Velocity	4 to 100	x 10 pps
V2324	Acceleration Time	1 to 100	x 100 mS
V2325	Deceleration Time	1 to 100	x 100 mS
V2326	Error Code	(see end of section)	-

Registration Profile

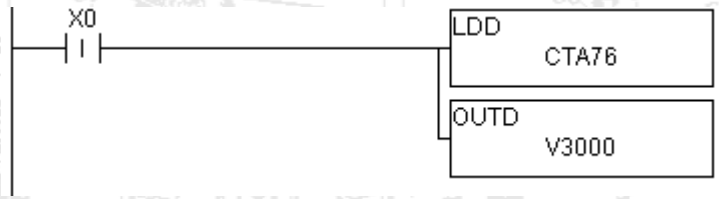
V-Memory	Function	Range	Units
V2320, bits 12-15	Registration Profile	9=relative	-
V2320, bits 0-11	Target Velocity Value	4 to 700	x 10 pps
V2321/ 2322	Target Position Value	-8388608 to 8388607	Pulses
V2323	Starting Velocity	4 to 100	x 10 pps
V2324	Acceleration Time	1 to 100	x 100 mS
V2325	Deceleration Time	1 to 100	x 100 mS
V2326	Error Code	(see end of section)	-

Velocity Profile

V-Memory	Function	Range	Units
V2320	Velocity Profile	2000 only	-
V2321/ 2322	Direction Select	80000000=CCW, 0=CW	Pulses
V2323	Velocity	4 to 700	x 10 pps
V2326	Error Code	(see end of section)	-

Position Control Setup

To capture a position during motion, try loading the counter value into a V register with an immediate contact.



An immediate contact is necessary because HSIO runs independent of the CPU.