

This Application Note is pertinent to the Unidrive SP, Commander GP20  
and Commander SK using SyPT Lite

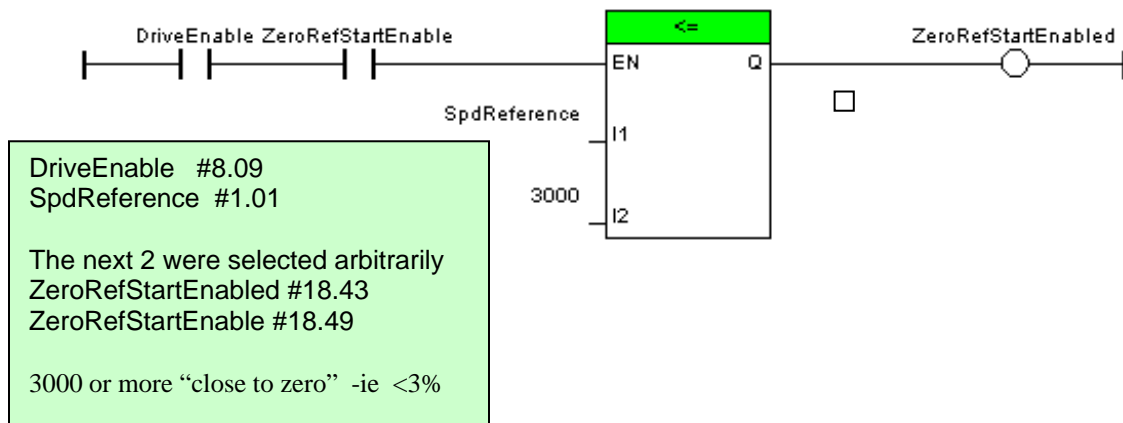
## Zero Reference Drive Interlock

**Introduction:** Another function customers commonly request is a Zero Reference Start Interlock. With such a function, the drive is inhibited from starting unless the speed reference (typically from a Speed Pot) is zero or near zero. A first glance this doesn't sound very difficult but there is one gotcha. What you don't want is try to start the drive with the speed pot at zero and be able to walk away having "armed" the circuit. This could create a potentially hazardous situation whereby the drive is armed and should someone simply come by and turn the speed pot the drive would immediately appear to come on and follow the pot. To take care of this situation it requires some additional logic- just the kind of thing SyPT Lite was created for !!!

### Implementation

First of all, we need to know that the Speed Reference is at or near zero. SyPT Lite includes a series of magnitude comparators for such purposes. However, in order to make this a more general function, I included a control bit to make this function optional if one wished. Therefore I assigned a bit I called ZeroRefStartEnable for this purpose. I included DriveEnable on general principals although after thinking more about it, it is probably redundant in this particular rung of logic.

(\* Zero Reference Start Interlock Feature- Looks at Zero Ref from Speed Pot \*)



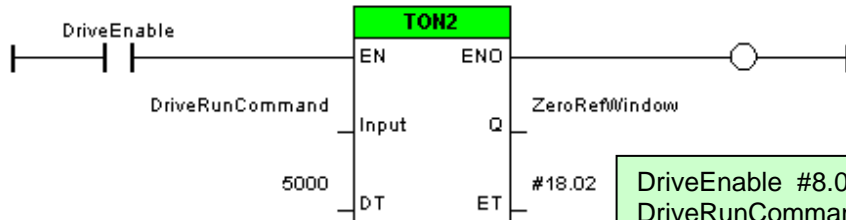
### Disclaimer

The SyPT Lite examples provided here are just that, **examples**. They can be used for reference when creating your own application solutions. Control Techniques does not warrant these examples "as is" for actual use. The examples are intended to stimulate ideas and facilitate application solutions. One always needs to consider and test **all aspects** of a system implementation to insure integrity and safety of their particular intended application.

## Implementation con't

The next bit of logic opens a window for 5 seconds to see if the Speed Reference is at or near zero . If it is then the drive will go into Run. If it is not and more than 5 seconds go by, then the Start request is ignored- another Start Request ( DriveRunCommand ) would be necessary.

(\* Looks for a Zero Speed Reference for 5 seconds, to prevent inadvertent Starting \*)



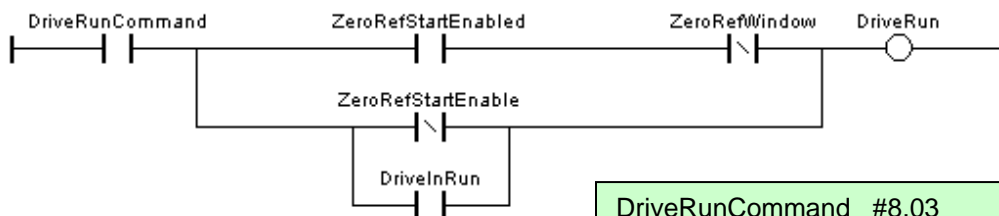
DriveEnable #8.09  
DriveRunCommand #8.03

The next was selected arbitrarily  
ZeroRefWindow #18.42

I didn't need the elapsed time so I  
just stuffed it into #18.02

The final bit of logic is the actual Zero Reference Start logic.

(\* Modified Drive Run command depends on Zero Reference Start Function \*)



DriveRunCommand #8.03  
SpdReference #1.01

The next 2 were selected arbitrarily  
ZeroRefStartEnabled #18.43  
ZeroRefStartEnable #18.49

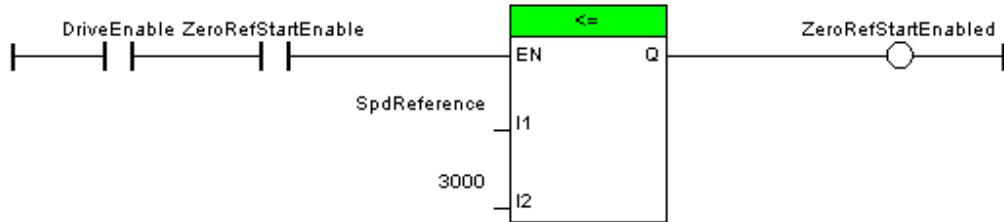
DriveRun #6.34  
DriveInRun #10.02

If the **DriveRunCommand** is ascertained **AND** the **ZeroRefStartEnable** bit is **not ON**, then the drive works normally as it would out of the box.

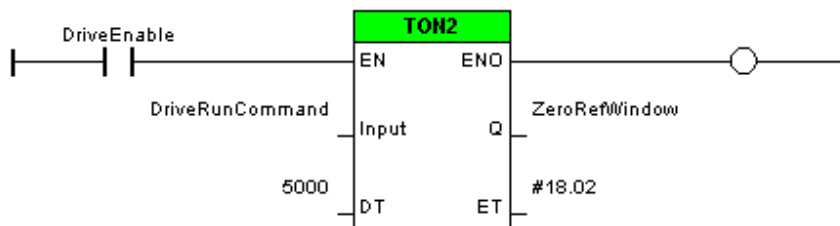
However, if the **DriveRunCommand** is ascertained **AND** the **ZeroRefStartEnable** bit is **ON AND** this occurred within the **ZeroRefWindow** time, then the drive would go into **RUN** and remain in **RUN** after the **ZeroRefWindow** time expired.

So altogether it becomes:

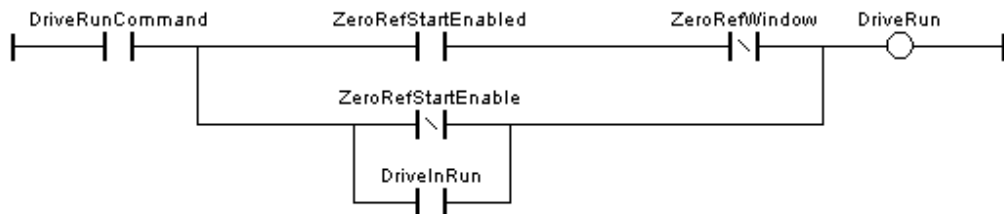
(Zero Reference Start Interlock Feature- Looks at Zero Ref from Speed Pot\*)



(Looks for a Zero Speed Reference for 5 seconds, to prevent inadvertent Starting\*)



(Modified Drive Run command depends on Zero Reference Start Function\*)



## Summary

From this SyPT Lite example, one should realize that if the base drive does not have a certain desired function, often you could create your own functions required using the built-in PLC ladder functionality provided by SyPT Lite.

To obtain SyPT Lite click here → [SyPT Lite](#)



Questions ?? Ask the Author:

**Author:** Ray McGranor  
(716)-774-0093

**e-mail :** [ray.mcgranor@emerson.com](mailto:ray.mcgranor@emerson.com)

