Single Axis Slow Speed Motion Control System Using Red Lion Products

Purpose of System:
This system layout is capable of repeatable and reliable slow moving motion control system such as repetitive wood working and or lathe work where basic speed control along a given length is desired. This would be where being able to speed up or slow down either a feed rate, turning speed, or to do various levels where the speed of the axis being controlled can either improve productivity or work finish.

Products Used:
1. Encoder 1000PPR
2. PAX2-D Meter w/optional 4 relay output
3. Graphite HMI (Could be CR3000)
4. VFD/DC drive (Furnished by Customer)

Methodology:

A. Starting at Home position, the machine is started up allowing for the progress of the system to start

B. As the axis with the encoder is moving the numeric value in either pulses or length of movement is being incremented in the PAX2-D

C. Assuming a metal shaft 10ft long by 2ft around is being mechanically sanded to remove rust and debris for refurbishment. Setting up the starting point setpoints in the PAX2-D

    a. Home (PAX2-D reads 0.000)

    b. Sanding head edge detected by laser photo eye

    c. Start high speed sanding head RPMs (Relay 1 in PAX2-D goes high, triggering and increase in VFD speed output to run sanding belt faster as sanding head travels along length of shaft

    d. End of metal shaft detected by laser photo eye

    e. After PAX2-D goes past the numerical setpoint put in it from the HMI, Relay 1 goes low, and Relay 2 goes high stopping the sanding head

    f. Operator returns sanding head back home to either do a second sanding run OR gets set up for a new shaft.

Notes:
- In this example
    - Sanding head feed rate is held constant thru mechanical gearing like on older lathes
    - Turning rate of shaft being sanded is held constant again thru fixed gear rates
    - Only Axis being varies is the sanding belt/disc depending on what is chosen

Application:
- The encoder feeds the PAX2-D, and it does the measuring
- Setpoints are put into the PAX2-D that will speed up, slow down, and stop the sanding belt head
- Most older lathes have mechanical trip features on the feed shafts so the laser photo eyes may not be needed.
- If needed a secondary PAX2-D with encoder could be put on the feed shaft to help with the return of the unit depending on the gearing of the unit.