SEA M4500 BASIC RESOLVER TROUBLE-SHOOTING
Revised July 9, 2025

Overview:

The PLS section of the M4500 is a high speed Programmable Limit Switch which accepts angular position information in the form of resolver format signals and converts these to digital. The M4500 is configurable for 8, 16, 32 or 64 timing channels. These are mapped to internal memory locations of the M4500 for use by the PLC section. The timing channels can be programmed "ON" and "Off" at user defined position set-points.

The scale factor of the PLS is programmable from 2 to 4096 divisions per revolution.

The offset is programmable from 0 to one minus the scale factor offset and is used to electronically zero the resolver shaft. The M4500 contains an auto zero algorithm which will automatically calculate the offset required to make the current position of the resolver shaft zero.

Resolver Cable:

With the cable connected to the resolver and the input connection to the M4500 **disconnected**, verify there is NO continuity between any of the wires (R1, R2, S1, S2, S3, S4) as well as to the cable shield. If there is continuity between any of the connections then the problem is most likely with the cable and should be replaced.

Measure the resistance of the rotator (R1-R2) and the two stators (S1-S3 and S2-S4). The resistance will be the same (or nearly the same) from S1-S3 and S2-S4 but will be different than that of R1-R2. If there is an open connection (no resistance measured) then the problem is either in the cable or the resolver. Connect another resolver to the cable and repeat the resistance measurements. If the results are the same then the problem is most likely in the cable. Replace the cable. Otherwise the problem is most likely in the resolver. Replace the resolver.

Reconnect the resolver input connection to the M4500 as well as verify the resolver cable is securely connected to the resolver.

Resolver Reference:

With the cable connected to the resolver and the input connection to the M4500, use a DVM (Digital Volt Meter) in **AC** mode, to measure the voltage between R1 (reference in) and R2 (reference ground) at the M4500 resolver connector. The voltage should read about 1.45Vrms (anything between 1.0 to 2.0 Vrms would be correct). If no voltage is read, replace the M4500.

Note: Be sure the DVM is in **AC** mode, this is NOT a DC voltage.

Again using a DVM in **AC** mode, verify the voltage between S1 (SIN GND) and S3 (SIN) at the resolver connector. While slowly rotating the resolver forward the voltage should vary between 0 and 2.0 Vrms. If the voltage stays at zero as the resolver is rotated forward, check the resolver wiring for a loose connection. If the wiring is OK, replace the resolver.

Check the voltage between S2 (COS) and S4 (COS GND) at the resolver connector just as was done for S1 and S3 above. It should read just as S1 and S3, however when S2 and S4 is at the peak (2.0 Vrms), S1 and S3 should be at the minimum (0 Vrms).

If the steps above check out OK then verify the resolver coupler. Make sure the key is installed in the resolver shaft and the coupler is tight.

Note: The frequency of this signal is 2500 Hz. For this reason, some DVMs may read the voltage slightly low.

Finally, verify position for one full rotation of the resolver. Position the resolver at 0. By hand rotate the resolver forward. If the resolver scale factor is 360 then the position should be linear and increase from 0 thru 359 and again be at 0 without any significant jumps or gaps in the value of the position.

Associated Resolver Variables:

B170	Timing Channel States (CH00 – CH07)
B171	Timing Channel States (CH10 – CH17)
W178	Resolver Position (updated in TIMED Interrupt)
W180	Resolver Position (updated in MAIN Program)
W182	Resolver RPM
W186	Resolver Scale Factor
W188	Resolver Offset