Eliminating Motor Creep

This application note is pertinent to Quantum III/Mentor II drives.

In some machine applications where the frictional losses are very low, any offsets in analog references can result in motor creep. This application will outline methods to identify where the creep is originating & possible methods to eliminate it.

Finding where the “creeping” is coming from:

- Minimum Speed Setting
- Speed Offset
- Digital speed reference selected
- Noise on the Analog Reference

Minimum Speed:

Parameters #1.07 (min speed forward) and #1.08 (min speed reverse) located in the Black box shows where one could put in a preset Minimum speed to cause the drive to rotate when enabled.
**Speed Offset:**

Parameter **#1.04** is the analog reference offset. This parameter determines that amount of offset or trim that is being added or subtracted from the analog input. This is pictured about in the **Red** dashed box.

**Digital Speed Selection:**

Speed signals can be digitally selected. Parameters **#1.14 and #1.15** can control which reference is being selected (1.17, 1.18, 1.19, or 1.20). This is pictured above outlined in the **Blue** dashed box.

If Parameters #1.14 and #1.15 are not what we expect (both at 0) then we need to know what is controlling the state of these bits. Function switches that are controlled by **terminals 22 through 30** on the MDA 2B board can influence these bits.

How do you find which parameter is controlling the changes? Parameters **#8.02 through #8.10** represents the function inputs. Parameters **#8.12 through #8.20** represents the destination. If you find that in parameter **#8.12 through #8.20** has the values of **#1.14 or #1.15**, then we can start working backwards to find out what is controlling these changes.

Pictured below shows the destination of where they can be found in Parameters **#8.12 through #8.20**.

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**We do not suggest that you change the parameters inside of your drive without going through your system setup and confirm that there is an error in programming and not just a switch that is in the wrong position.**
Parameters #12.07 and #12.12 can write to the reference selector. Parameter #12.03 and #12.08 are the source of what is causing the destination to be altered.

**Source**

12.03 : 302

12.04 : 0

12.05 : 2

**Destination**

12.07 : 0

12.01 : 0

12.06 : 0

**Stray Noise:**

Noise on the speed signal in will cause the unwanted rotation as well. This signal that the drive is getting can be coming from something as simple as not using the proper twisted shielded pair cable. Wires that are carrying low voltage signals should be twisted around each other and within shielding that is connected to the common of the drive. Pictured below is the proper way to wire a speed signal input to our drive.
Avoiding Noise:

- Low voltage signals should run in separate conduit from how powered AC signals.
- Excessive wire should be trimmed or cut.
- Low voltage signals should avoid long distance communications.
- When possible one should use a Current Input Signal.

Ways around the Noise:

1. Standstill Mode Parameter #5.19. This parameter is defaulted for 1 in Quantum III drive. This allows the drive to have a “creep” speed that is sometimes unwanted. Simply just set this parameter to 0 and save.

2. Zero Speed Threshold Parameter #3.23. This parameter is defaulted for 16 (1.6%) in both Mentor II and Quantum III drives. You can adjust this parameter up to 25.5% (255) of maximum speed before Zero speed Threshold is exceeded.

3. Adjust the Speed Offset Fine, Parameter #3.22. Decreasing this value may have some positive effects that are desired.

4. Building a dead band around Zero speed. Pictured below is how you can use Menu 12 (Programmable Threshold) to eliminate unwanted noise around Zero speed. Parameter #12.04 is the “window” that will act like the dead band. In the example the signal will have to come above 10 (or 1%) before the single will activate.
Parameters that need to be changed are listed below.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.03</td>
<td>117</td>
<td>12.04</td>
<td>10*</td>
</tr>
<tr>
<td>12.06</td>
<td>1</td>
<td>12.07</td>
<td>114</td>
</tr>
<tr>
<td>5.19</td>
<td>0</td>
<td>1.18</td>
<td>0</td>
</tr>
</tbody>
</table>

* This number can be changed depending on the dead band/noise immunity wanting to be achieved near and around Zero Speed.

For a free version MentorSoft that can be used to communicate with your drive the link is provided below.

http://www.emersonct.com/download_usa/software/Msoft224.exe

A special communication cable is needed to use MentorSoft. The part number of this cable is (Part # CTD-PC-485-010)

If there is some conflicting parameters that you need to be addressed for this application, contact Control Techniques Technical Support at 1-800-367-8067

Questions: Ask the author??

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