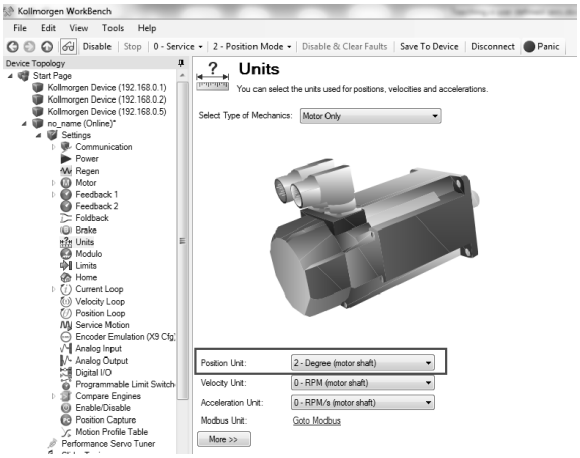
Teaching a user defined zero “home” position on a direct drive motor with single-turn absolute feedback on the AKD Motion Tasking drive (AKD-P)

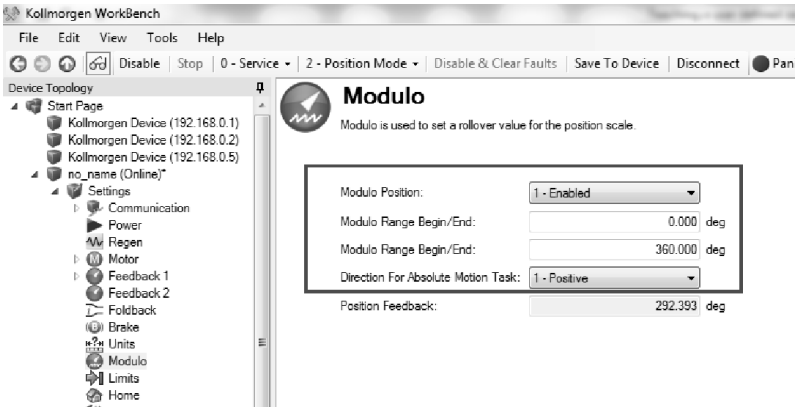
This application note was generated using a single turn Endat absolute feedback device but this can apply to singleturn absolute BISS, Hyperface, Sine Encoder encoders and SFD and resolvers as well. The term direct drive is generic meaning that this is not exclusive to our direct drive products (i.e. DDR, Cartridge DDR, KBM, etc.) but any combination where the load is directly driven by the motor and there is a 1:1 correspondence between motor degrees and load degrees.

1. Position unit in Workbench is set to “Degrees”.



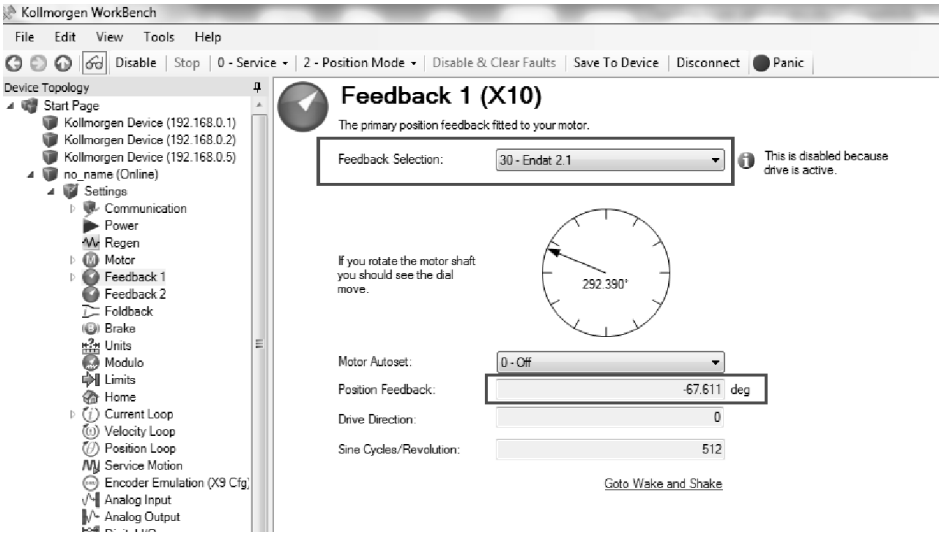
2. Drive will be setup to use modulo so the position of the DDR is always between 0 and 360 degs. Notice the beginning and end points of the range. Also an important note for later is to choose the direction for an absolute motion task. This is application dependent. Some applications require the rotary table to always rotate in the same direction. Other applications may need the table to move in either direction using the shortest distance from the current position to the target position of the motion task.

Modulo Setup:



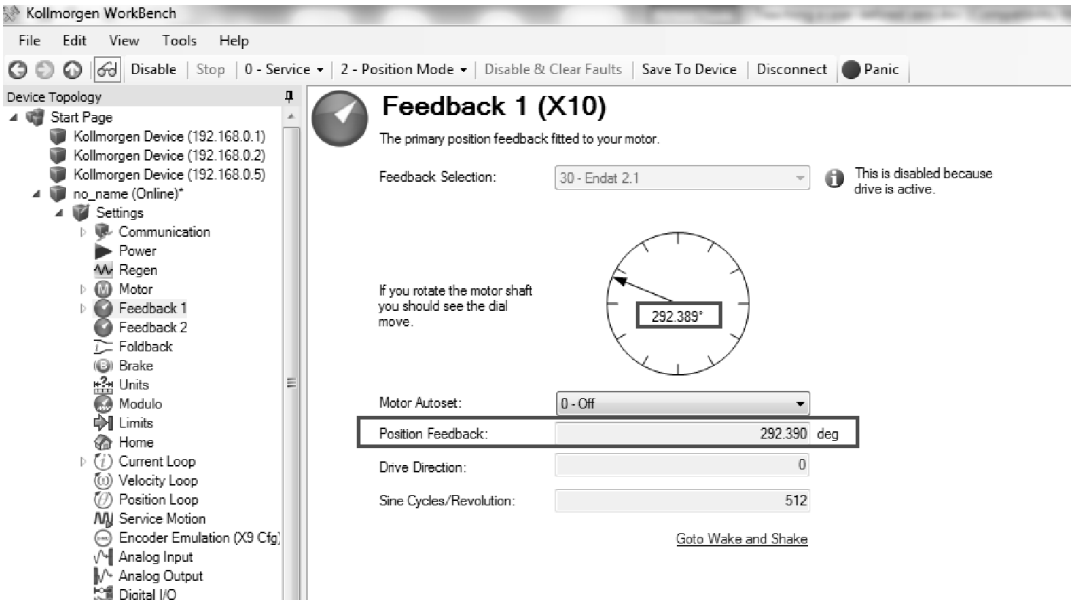
To demonstrate the need for Modulo: without Modulo enabled, on power up the feedback is read and in this case is approximately -67 degs. The mechanical position is 292 degrees. The reason for this is the feedback is read on power up (PL.FB) and the sign is dependent on the direction the shaft is turned from the zero angle.

Before Modulo is enabled:

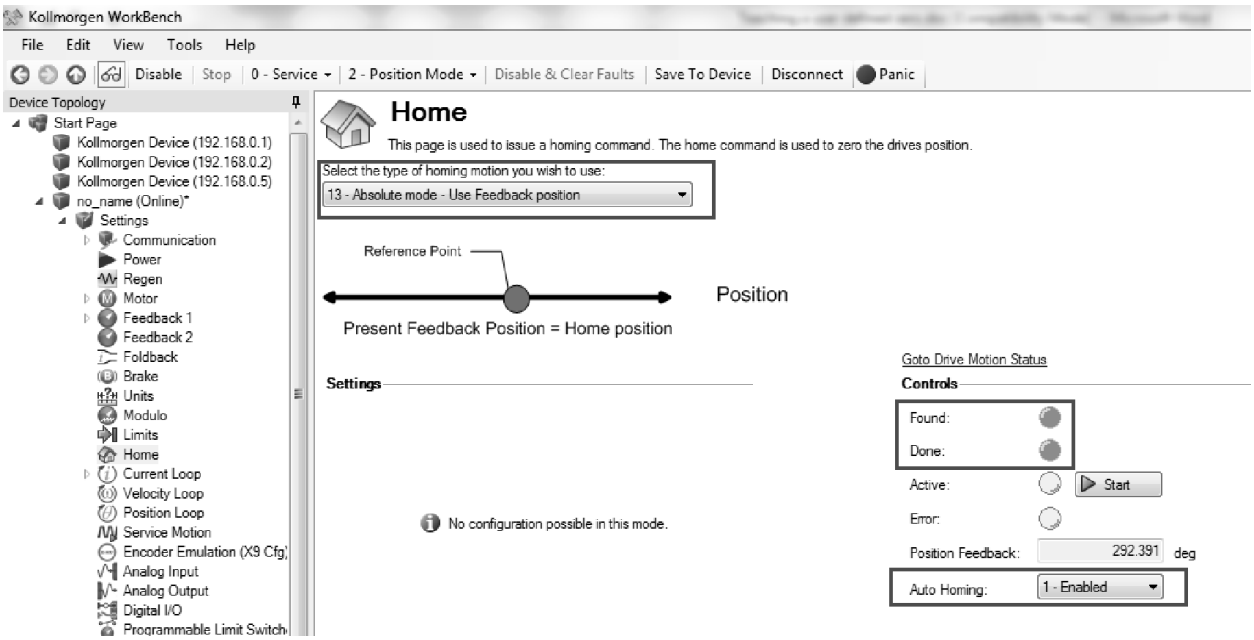


After Modulo is enabled:

You'll notice the mechanical position and the feedback position now are in agreement. The modulo essentially takes care of the negative feedback read and ensures the position feedback is always between 0 and positive 360 degrees.

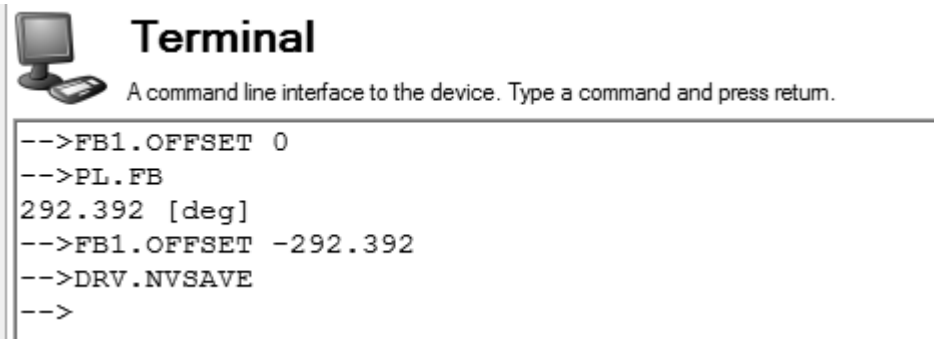


3. Homing Mode will be 13-Absolute Mode and auto-homing will be enabled such that the home found and home done bits are set. (Auto Homing: Allows the system to auto-home on power up). Mode 13 simply uses the current position as the position. This is necessary as without the home found and done, executing Motion Tasks will not be allowed.



4. To initially teach the zero position, the drive will be disabled (via STO for example) and the operator will manually move to the desired location around the perimeter or alternatively in some applications the table will be jogged to the desired “home” position and then the drive is disabled.

5. To set the new zero position the following process is used. Note Workbench terminal is used for demonstration but if the application uses a fieldbus, the same steps must be performed over the given fieldbus.
   a. Zero the FB1.OFFSET value. Note the drive must be disabled in order for the FB1.OFFSET to be changed.
   b. Read the position feedback (PL.FB)
   c. Set the FB1.OFFSET to the correct offset value (+ or - opposite of the PL.FB sign).
   d. Store the change to non-volatile memory (DRV.NVSAVE)



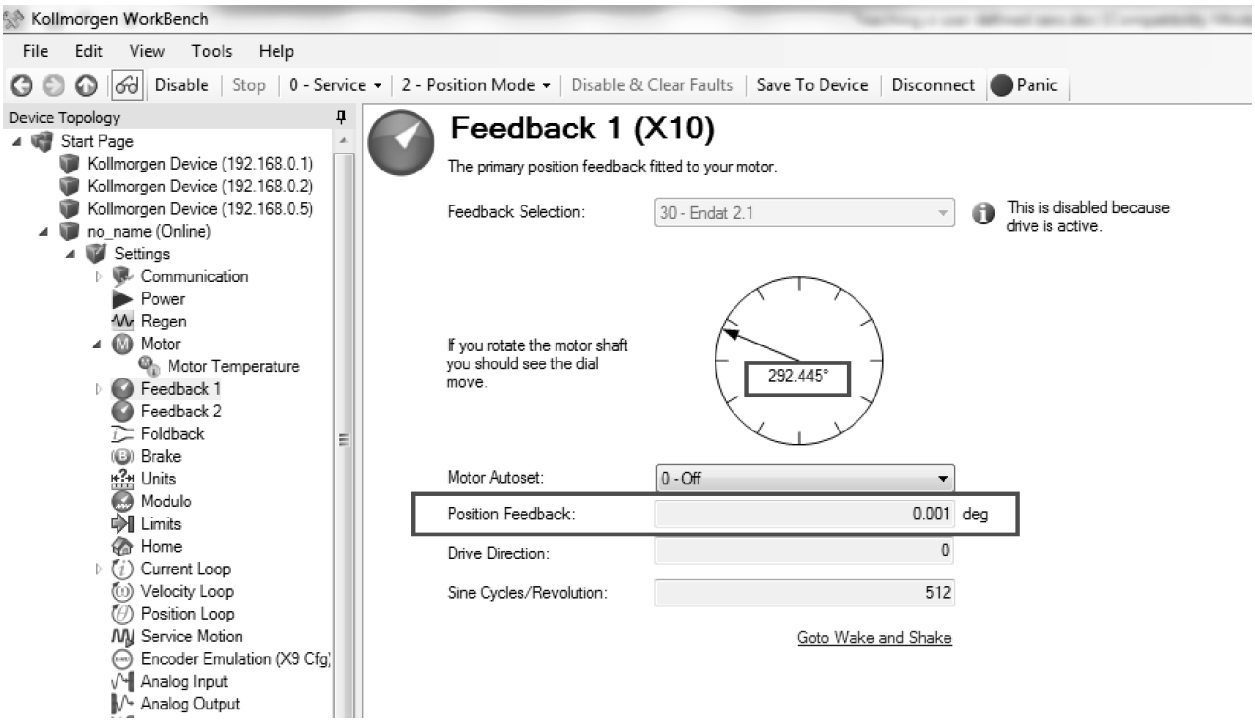
Note: From the Workbench Help:

FB1.OFFSET is a value added to the position feedback (PL.FB).

Example: If PL.FB is 10 deg and FB1.OFFSET is set to –10 deg, then the next read of PL.FB will return ~0 deg.

6. On power up, the system will use the auto-homing as described above (with no movement). In order to position the motor (table) to the taught position a Motion Task setup for 0 position and absolute move type is triggered/commanded. Recall the path the move takes depends on the "Direction for Absolute Motion Task" setting on the modulo screen.

Notice now the "zero" position is now a function of the given offset.



7. In order to re-teach the DDR to a new 0 (home) position, repeat steps 4 and 5.