Objective

To configure the 690+ drive to obtain a ***Phase Move***

The 690+ firmware version 2 or greater supports the *Phase Move*. The *Phase Move* is a simple trapezoidal relative move, to the master (it is added to the speed demand). It acts on each rising edge of the *Enable* input. The slave shaft is moved a fixed distance at a rate given by the *Velocity* parameter. A move must be completed before a new move will be registered. See Figure 2 for a Functional Description.

Equipment

690+ drive with firmware version 2 or greater operating in the Closed Loop Vector mode and the software DSELite.

NOTE: The drive is not required to have the optional Systems Board, to support the *Phase Move*, but an encoder on the feedback motor is required along with the HTTL Speed Feedback TechBox at a minimum. If the Systems Board is used, the HTTL Speed Feedback TechBox is not required.

Description of the 690+ System Blocks for firmware version 5.x

Phase Move block**:**

Enable: If the function block is not already *Active*, *Enable* starts the *Phase Move* operation when going from False to True. Setting the *Enable* to False while a move is *Active*, will not abort the operation. This parameter is interlocked with the *Phase Control* block, thus *Phase Control / Position Enable* must be True **before** the *Phase Move / Enable* goes True. To abort the *Phase Move* once the operation starts, set *Phase Control / Reset* to True. When this is done, all *Phase Move* data will be lost.

*Distance***:*** Sets the coarse distance (in motor revolutions) that the move command, will add to the phase loop. The range of this parameter is 3000.0 to – 3000.0 (motor revolutions). A negative (-) distance indicates that the motor will rotate reverse.

*Distance Fine***:*** Additional *Distance* to allow fine control of position. The range is 1.0000 to –1.0000

*Velocity****: The maximum velocity at which the distance is added to the phase loop. *Velocity* is a % of the *Max Speed* parameter. Thus if *Max Speed* = 1800 RPM and *Velocity* = 90%, the actual Velocity = 1800 x 0.9 =1620 rpm.

*Acceleration****: The acceleration at which the distance is added to the phase loop.
Acceleration = (100 / desired acceleration time in seconds). I.E. acceleration of 20 = 100 / 5 seconds desired

Distance Left: Diagnostic showing the distance remaining before the move is complete.

Active: Will be True when the *Distance Left* is none zero.

***NOTE: Do not change these parameters while a *Move* is *Active*. The block may not respond as expected.**

Phase Configure block:

Slave Count Source: Selects, "where the 'source' for the counter blocks comes from", either the HTTL Encoder Speed Feedback Techbox or System Board (terminal strip B). Select accordingly.

Speed Loop Speed Fbk: Selects where the speed feedback for the 690+ comes from, either the HTTL Encoder Speed Feedback Techbox or System Board Slave encoder (terminal strip B). Select accordingly.

Max Speed: This parameter must be connected to *Max Speed* in the *Setpoint Scale* block.

If you have questions, please call the Product Support Group at (704) 588-3246.

Counts Per unit: Normalizes the encoder counts, e.g. if the encoder is 2048ppr, counting rising and falling edges on A & B inputs, it produces 2048*4 counts in every rev. Setting the Counts per unit to 8192 produces a position value of 1.00 per rev. Set this parameter to 4 times the encoder ppr.

The remaining *Phase Configure* blocks have no effect with this application.

Phase Control block:

Position Enable: Enables the accumulator portion of this block. If set False, the accumulator is to zero and any phase data is reset. This parameter must be set True before *Phase Move / Enable* is set True. This parameter is interlocked with the *Phase Move / Enable* parameter. The *Position Enable* must be True **before** the *Phase Move / Enable* is set True.

*Reset (Total)**:* A Total reset of the Speed Output and the Output (Phase Loop). When a reset is performed, all phase data will be lost. This parameter must be False to calculate an output.

Procedure / Theory of Operation:

1. Using ConfigEd Lite, configure the drive to match the template as shown in Figure 1.
2. In the *Phase Configure* block, make sure that *Slave Cnt Source* and *Sped Loop Spd Fbk* parameters are set correctly. If using a TechBox for the motor encoder feedback, select these 2 parameters for *TB Encoder*. If using a Systems Board for the motor encoder feedback and the feedback encoder is connected to terminal strip B, set these parameters for *Slave Encoder*.
3. Use the *690+ Quick Start* (HA4700631) guide to set up the drive and Autotune the drive in the Closed Loop Vector mode.
4. Set the desired *Distance, Velocity* & *Acceleration* values, in the *Phase Move* block.
    a) Example: If the *Distance* is set to 1.0, the motor will rotate 1 revolution when the *Phase Move / Enable* is set True.
    b) Example: If the *Distance* is set to 100.0, the motor will rotate 100.0 revolutions when the *Phase Move / Enable* is set True.
    c) Example: If the *Distance* is set to -100.0, the motor will rotate -100.0 revolutions (reverse motor rotation) when the *Phase Move / Enable* is set True
5. Start the 690+ drive. (Enable *Run Forward*). Make sure that *Phase Control / Position Enable* is True and the *Phase Control / Reset (Total)* is False. When *Phase Move / Enable* goes True, the *Phase Move / Active* becomes True, the motor will rotate at the values set in the *Phase Move* block. The *Phase Move / Distance Left* will count toward 0. When the operation is completed, the *Phase Move / Active* becomes False and the value added to the Speed Loop from these blocks will be 0.
    a. **NOTE**: If the motor continues to rotate after the *Phase Move* has completed, there may be a polarity issue. If this is the case, try changing *Phase Control / Invert Output* from False to True.
6. Once the *Phase Move / Enable* goes True, the Move will complete the operation even though the *Enable* goes False.
7. For optimum performance, the Speed Loop and the Phase Loop should be tuned. See Application Note 3405, which explains the 'Phase Tuning Procedure', page number7.

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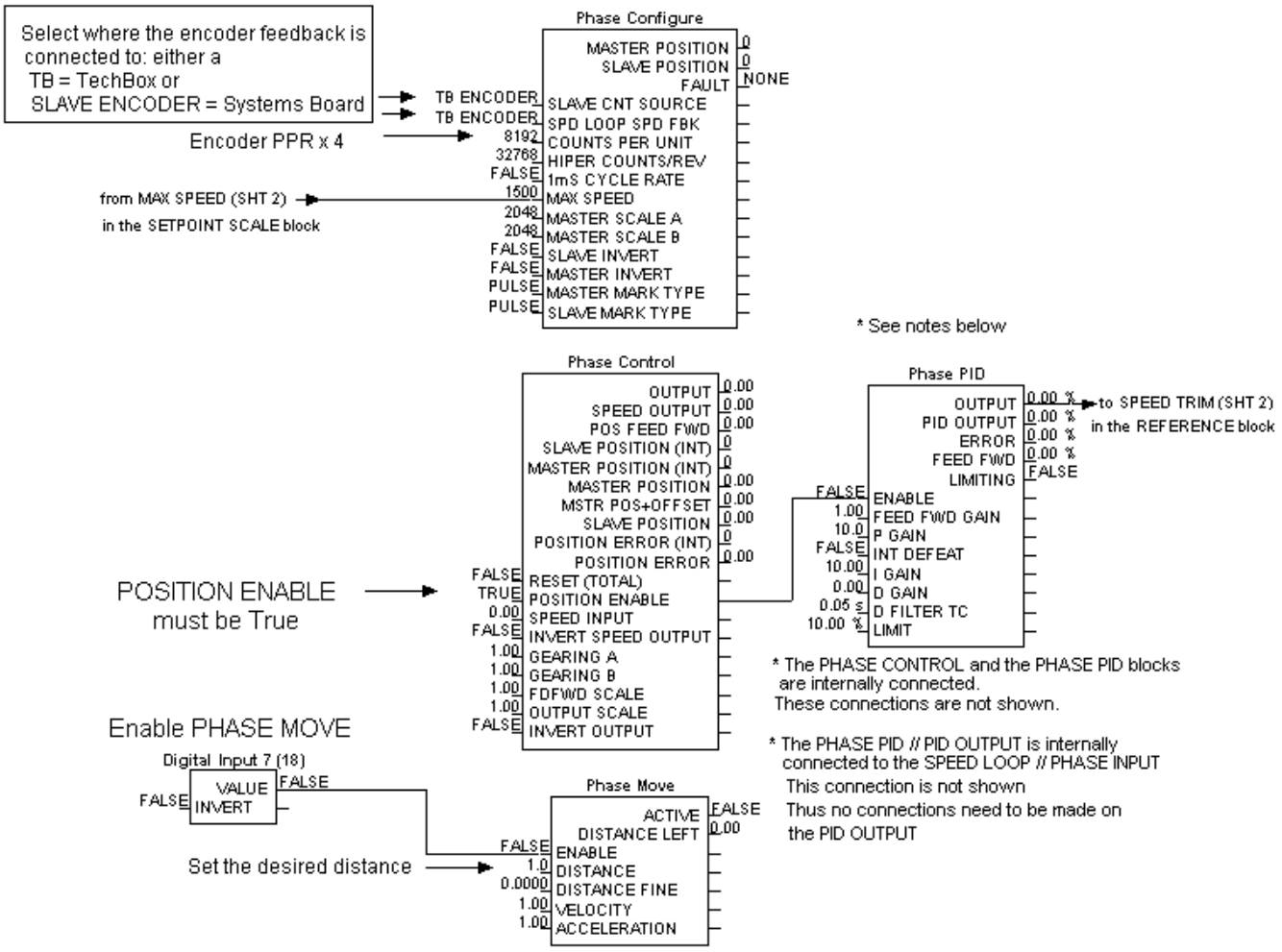
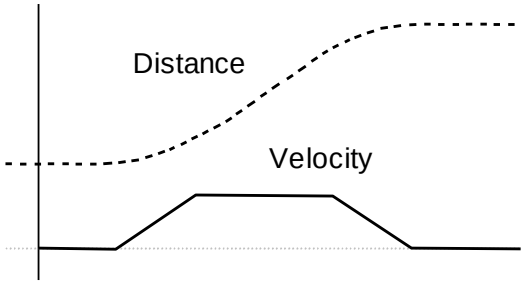


Configuration for drive firmware version 5.x

Figure 1



Functional Description of a Phase Move

Figure 2

If you have questions, please call the Product Support Group at (704) 588-3246.