

BIOPURE HX2® WATER SYSTEMS ALLEN BRADLEY POWERFLEX-523 1ST PASS VFD PARAMETER ADJUSTMENT

Purpose

The purpose of this Tech Note is to describe the steps needed to tune the 1st-pass Powerflex VFD to be properly functional within BioPure HX2 systems.

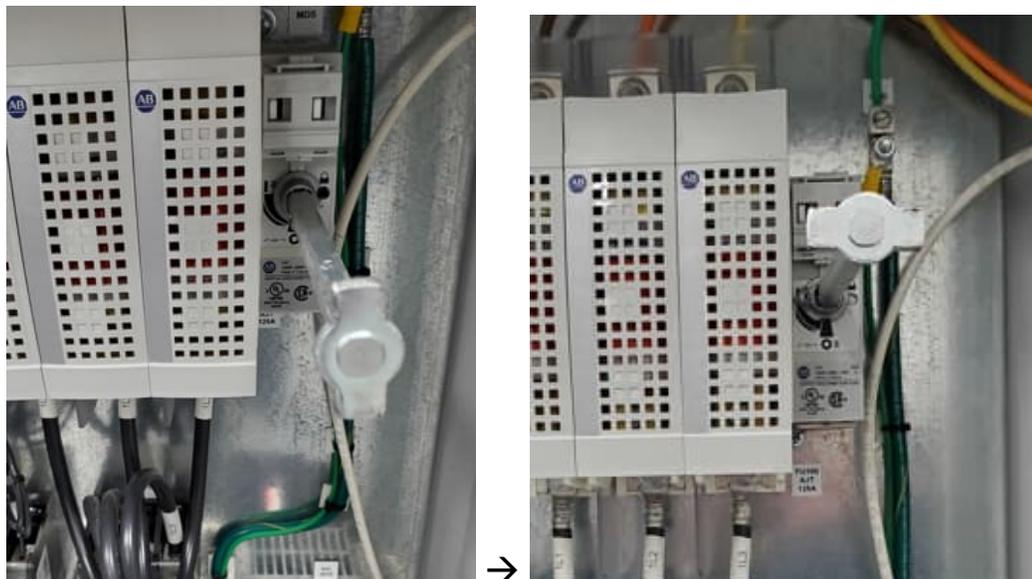
Procedure

The tuning required is a four-step procedure, as follows:

(NOTE: At each step, write down the original values of the parameters before changing them.)

1. Changing the Pulse-Width Modulation (PWM)

- 1.1. Open the lower panel and turn on the power by rotating the starter clockwise.



- 1.2. The 1st pass VFD will turn on. On the VFD press the escape button “Esc” to get to the settings options.
- 1.3. Press the “Sel” button to change the cursor’s position. Use the direction buttons ↑ or ↓ to get “440” from the right (the far-left letter will automatically become an “A”).



- 1.4. Select this by pressing the enter key ↵.
- 1.5. This is the PWM setting. Change its value to 4.0, then select it with the ↵ key.



Description of parameter A440:
 The VFD controls the output frequency through pulse-width modulation (PWM). The IGBT fires DC bus voltage in pulses to the motor, and it adjusts the length of each pulse. Voltage seen by the motor = average voltage over time, and so if the pulses are modulated, a sinusoidal wave can be simulated. Increasing PWM carrier frequency will have more accurate control of the motor, but it also increases the heat output of the drive.

2. Setting Flying Start

- 2.1 From step 1.5, press the “Esc” button to get back to the settings.
- 2.2 Set to “545” and select it with the ↵ key.



- 2.3 This is the Flying Start setting. Set its value to 1, and press ↓.



Description of parameter A545:
Sets the condition that allows the drive to reconnect to a spinning motor at actual RPM.
1 = "Enabled", 0 = "Disabled".

3. Setting Start Source

- 3.1 From step 2.3, press the "Esc" button to get back to the settings.
3.2 Set to "046" and select it with the ↓ key (the far-left letter will become a "P").



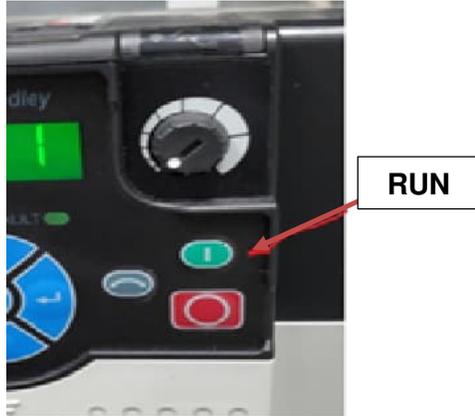
- 3.3 This is the Start Source setting. Set its value to 1, and press ↓.

Description of parameter P046:
This sets where the drive gets the run command from. If set to 1, the run command is from the keypad. If set to 2, it's from the digital input terminal. To manually Autotune, this would need to be set to 1.

- 3.4 Reset the RUN command to 2 after the Autotune is complete.

4. Autotune

- 4.1 From step 3.3, press the "Esc" button to get back to the settings.
4.2 Set to "040" and select it with the ↓ key.
4.3 This is for the Autotuning. Set its value to 1 with the ↓ key and press the green button. The machine will take about 20-30 seconds to perform the autotune. (The value will change back to 0 when complete.)



Description of parameter P040:

Autotune helps the VFD control the motor by adjusting to various motor parameters (e.g., torque, RPM, number of poles, etc.). It induces the appropriate magnetic flux that will most effectively operate with the stator. Since there are many types of motors, this process allows the VFD to automatically adjust to the right current states.

- 4.4 Reset the drive command to 2 after the Autotune is complete.
- 4.5 Shut off the BioPure HX2 water system and close the panel.

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