Overview

This document describes the parameter settings for a Yaskawa AC Servo drive system using an MPU11 or a CPU10b motion control card with either Sigma II or Sigma I Servo Packs.

MPU11

Velocity Mode control of 3rd party servo drives is the only supported method of control on MPU11 systems because of the ease of setup and tuning. The Sigma II should be setup and run by itself before connecting the CN1 header to close the loop to the Centroid system. The following list of parameters details what is known to be required for standard usage of a Sigma II pack drive. If you have a special application contact Tech. Support for recommendations.

Parameter Settings for the Sigma II Servo Pack

Before setting parameters it is good to start from factory defaults. To do this press DSPL/SET to get to Fn000, change to Fn005, then press DATA/ENTER. You will see P.InIt on the display press DSPL/SET to reset to factory defaults.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fn005</td>
<td></td>
<td>Restore Factory Default</td>
</tr>
<tr>
<td>Pn001</td>
<td>0</td>
<td>Select Velocity Mode</td>
</tr>
<tr>
<td>Pn201</td>
<td>16384</td>
<td>65536 counts/rev.</td>
</tr>
<tr>
<td>Pn300</td>
<td>450</td>
<td>4.5V at rated speed of 1500rpm, 9V at 3000rpm</td>
</tr>
<tr>
<td>Pn304</td>
<td>0</td>
<td>Soft start accel time</td>
</tr>
<tr>
<td>Pn305</td>
<td>0</td>
<td>Soft start deccel time</td>
</tr>
<tr>
<td>Pn10B</td>
<td>4</td>
<td>Gain App. Switches - 4 means no mode switch function available</td>
</tr>
</tbody>
</table>

CNC11 Settings

1.) Go to Parameter menu and set the Motor Max RPM parameters P357 - 360 to the max RPM of your motors (i.e 3000)

2.) Go to the Machine configuration screen, under the motor screen set the encoder counts to 65536.

3.) Determine your default turn's ratio then plug it into this formula to determine your Max Rate.

\[
\text{Max Motors RPM} / \text{Turns Ratio} \times 0.85 = \text{Max Rate}
\]

4.) Go to the Jog screen under the Machine Configuration screen and enter the Max rates you calculated with the formula above.

5.) Go the PID menu, press F1-PID and set your default settings to:

<table>
<thead>
<tr>
<th>Kp</th>
<th>Ki</th>
<th>Kd</th>
<th>Limit</th>
<th>Kg</th>
<th>Kv1</th>
<th>Ka</th>
<th>Accel</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.04</td>
<td>0.0001</td>
<td>0.0</td>
<td>256000</td>
<td>0.0</td>
<td>80.0</td>
<td>0.0</td>
<td>0.7</td>
</tr>
</tbody>
</table>

Jog Test

The Jog Test is performed to ensure that the motor and drive run correctly before introducing more uncertainty. One of the common issues is that the wiring of motor power wires from the drive to the motor is incorrectly connected, resulting in drive errors. This will be detected much more easily if only the motor and drive are part of the equation.
**CPU10B**

**Parameter Settings for Yaskawa Sigma II Servo Pack**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pn000</td>
<td>0020</td>
<td>Select torque mode control, CCW is forward rotation</td>
</tr>
<tr>
<td>Pn001</td>
<td>0020</td>
<td>decel to stop on Overtravel then set to coasting state</td>
</tr>
<tr>
<td>Pn10B</td>
<td>0004</td>
<td>disable Mode switching</td>
</tr>
<tr>
<td>Pn110</td>
<td>0012</td>
<td>disable online autotune of Servo Pack</td>
</tr>
<tr>
<td>Pn201</td>
<td>4096*</td>
<td>16384 counts/rev.</td>
</tr>
<tr>
<td>Pn400</td>
<td>30-100</td>
<td>Torque reference gain - set to suit application</td>
</tr>
<tr>
<td>Pn407</td>
<td>1500-2500</td>
<td>Motor speed limit - depends on Motor and application</td>
</tr>
</tbody>
</table>

*Encoder count values are based on SGDH -10AE 0.85 kW motor running at 1500 RPM. If a faster speed is used Pn201 must be reduced to 2048 for 8192 counts/rev.*

**Settings in Centroid software**

Follow these steps for each axis that is controlling a Yaskawa Sigma II Servo Pack.

1. Go to the Motor Parameters screen and set Encoder counts/rev = 16384.

2. Go to Jog parameters screen and set Deadstart and Delta Vmax = 5. These values can be adjusted up or down depending on the machine and speed vs. accuracy desired and should only be adjusted by a qualified technician.

3. Go to the PID Configuration screen and set Kp = 0.25, Ki = 0.00391 and Kd = 5. Please note that we had best results on our test machine using Kv1 = 0 and Ka = 5. Optimal settings may vary.

**Parameter Settings for Yaskawa Sigma I Servo Pack**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CN-01 bit 8</td>
<td>On</td>
<td>All others off except on Z.</td>
</tr>
<tr>
<td>CN-01 bit 2</td>
<td>On</td>
<td>Z-axis only.</td>
</tr>
<tr>
<td>CN-02</td>
<td>ff</td>
<td>All bits. All axes.</td>
</tr>
<tr>
<td>CN-0A</td>
<td>2048</td>
<td>PG dividing Ratio.</td>
</tr>
<tr>
<td>CN-13</td>
<td>50</td>
<td>Torque reference Gain.</td>
</tr>
<tr>
<td>CN-17</td>
<td>0</td>
<td>Torque reference filter.</td>
</tr>
<tr>
<td>CN-2B</td>
<td>2</td>
<td>Torque Mode.</td>
</tr>
</tbody>
</table>
Settings in Centroid software

Follow these steps for each axis that is controlling a Yaskawa Sigma I Servo Pack.

1. Go to the Motor Parameters screen and set Encoder counts/rev = 8192.

2. Go to Machine Parameters screen and set parameter 60 = 8. This parameter determines the size of the PID filter.

3. Go to the PID Configuration screen and set Kp = 0.5 Ki = .00391, and Kd = 5.