

TB108 (Rev4) - Yaskawa Sigma I & II AC Servo Parameters

Overview

This document describes the parameter settings for a Yaskawa Sigma I or Sigma II Servo Pack when installed onto a CNC10 system or a CNC11 system that is in Velocity mode.

CNC11

Velocity Mode control of 3rd party servo drives is one supported method of control on a CNC11 system 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 Centroid technical 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.

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

CNC11 Settings

- 1.) From the main screen press F1(Setup)→F3(Config)→default password is 137→F3(Params). Set the motor max RPM parameters, 357 thru 360, to the max RPM of your motors (i.e 3000)
- 2.) From the main screen press F1(Setup)→F3(Config)→default password is 137→F2(Mach.)→F2(Motor). Set the Encoder Counts/Rev field to 65536.
- 3.) Using the axis pitch, determine the max rate of that axis using the following formula.

$$(\text{Max Motor RPM} / \text{Motor Revs/Unit}) \times 0.85 = \text{Max Rate}$$
- 4.) From the main screen press F1(Setup)→F3(Config)→default password is 137→F2(Mach.)→F1(Jog). Set the Max Rate.
- 5.) From the main screen press F1(Setup)→F3(Config)→default password is 137→F4(PID)→F1(PID). Set the values according to the following table.

K p	K i	K d	Li mi t	K g	K v 1	K a	A c c e l
0 . 0 4	0. 0 0 0 1	0 . 0	25 60 00	0 . 0	8 0 . 0	0 . 0	0 . 7

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.

CNC10

Parameter Settings for Yaskawa Sigma II Servo Pack

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

*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.

CNC10 Settings

- 1) From the main screen press F1(Setup)→F3(Config)→default password is 137→F2(Mach.)→F2(Motor). Set the Encoder Counts/Rev field to 16384.
- 2) From the main screen press F1(Setup)→F3(Config)→default password is 137→F2(Mach.)→F1(Jog). Set Deadstart and Delta Vmax to 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) From the main screen press F1(Setup)→F3(Config)→default password is 137→F4(PID). Set Kp to 0.25, Ki to 0.00391 and Kd to 5. Please note that we had best results on our test machine when Kv1 was set to 0 and Ka was set to 5. Optimal settings may vary.

Parameter Settings for Yaskawa Sigma I Servo Pack

Parameter	Value	Description
CN-01 bit 8	On	All others off except on Z.
CN-01 bit 2	On	Z-axis only.
CN-02	0	All bits. All axes.
CN-0A	2 0 4 8	PG dividing Ratio.
CN-13	5 0	Torque reference Gain.
CN-17	0	Torque reference filter.
CN-2B	2	Torque Mode.

CNC10 Settings

- 1) From the main screen press F1(Setup)→F3(Config)→default password is 137→F2(Mach.)→F2(Motor). Set the Encoder Counts/Rev field to 8192.
- 2) From the main screen press F1(Setup)→F3(Config)→default password is 137→F3(Params). Set parameter 60 to 8. This parameter determines the size of the PID filter.
- 3) From the main screen press F1(Setup)→F3(Config)→default password is 137→F4(PID). Set Kp to 0.5 Ki to .00391, and Kd to 5.

Document History

Rev4 Created on 2016-09-09 by #270

Rev3 Created on 2012-02-20 by #240

[Rev2](#) Created on 2008-09-22 by #297

[Rev1](#) Created on 2000-11-13 by #000