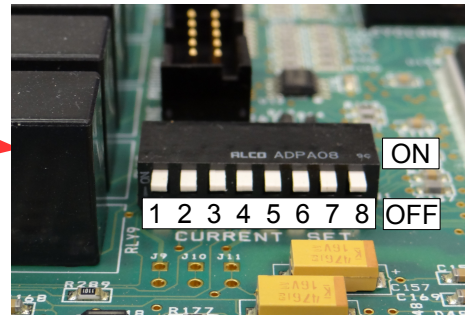
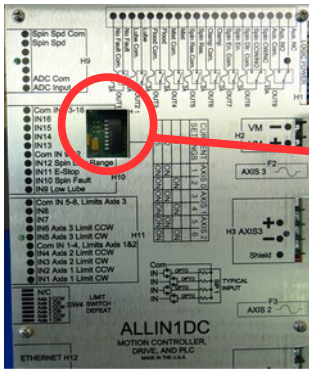


TB288 (Rev1) – Allin1DC Settings for 3rd Party Servo Motors

The Allin1DC has a switch that limits the maximum amount of current to the motor. A hole in the cover is provided to allow users to adjust the maximum current without having to remove the drive cover as shown below. For your reference, a close up picture of the current selector switch is shown. Use the table below to set the current correctly.

NOTICE: When adjusting the current, push carefully on the switch! The switch levers are plastic and can break off if too much force is used.



Allin1DC Drive Current Settings						
Current Setting	Axis 0		Axis 1		Axis 2	
	Switch 1	Switch 2	Switch 3	Switch 4	Switch 5	Switch 6
6 Amps	OFF	OFF	OFF	OFF	OFF	OFF
9 Amps	OFF	ON	OFF	ON	OFF	ON
12 Amps	ON	OFF	ON	OFF	ON	OFF
15 Amps	ON	ON	ON	ON	ON	ON

Current Settings for 3rd Party Servo Motors

Motor Constant Current Rating or Motor Constant Stall Rating	Recommended Allin1DC Current Setting			
	6	9	12	15
3 Amps	Recommended	Maximum Current	Not Recommended	
4 Amps				
5 Amps	Good Performance	Recommended	Maximum Current	Not Recommended
6 Amps				
7 Amps	Not Recommended	Good Performance	Recommended	Maximum Current
8 Amps				
9 Amps	Not Recommended		Good Performance	Recommended
10 Amps				
11 Amps	Not Recommended			Good Performance "AC/DC 30" recommended
12 Amps				
13 Amps				
14 Amps				
15 Amps				
16 Amps or more	Not Recommended, use "AC/DC 30" or "AC/DC 60" drive			

Not Recommended – The Allin1DC will provide too much or too little power to the motor.

Good Performance – The Allin1DC will provide good acceleration and good peak torque to the motors.

Recommended – Centroid recommended settings. Most likely to provide the best a balance between performance and motor temperature.

Maximum Current – The Allin1DC will provide maximum acceleration and maximum peak torque to the motors. Servo motors could overheat!

Software PID Settings for 3rd Party Servo Motors

In the PID menu, enter the motor parameters menu as shown below. Press **Setup (F1)** → **Config (F3)** (Password 137) → **PID (F4)** → **PID Config (F1)**. Set **Kp = 1.00**, **Ki = 0.004**, **Kd = 3.0**. Press **Save & Apply (F9)**. We will return to this menu after calculating maximum feed rate to tune the acceleration.

For some motors, manual PID tuning may be necessary as described in Technical Bulletin 260. (http://www.centroidcnc.com/usersupport/support_files/tbs/tb260.pdf)



PID Configuration Menu

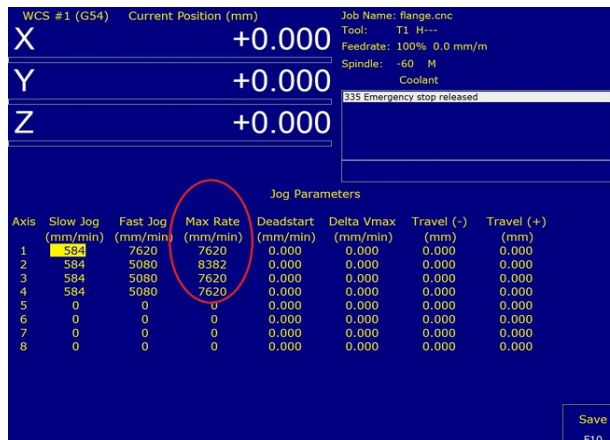
Manually Tune the Maximum Feed Rate

Exit to the main menu. Enter the maximum feed rate in the Jog Parameters menu (**F1 - Setup**, **F3 - Config**, **F2 – Mach.**, and then **F1-Jog.**)

Use the following equation to get an estimation: **(maximum motor rpm / motor revolutions per inch) * 0.85 = maximum feed rate.**

The calculated maximum feedrate may be too high due to variations in supply voltage and load. Use MDI commands to test the calculated machine maximum feed rate. Gradually issue faster feed commands until the maximum is determined. If the machine is displaying the following symptoms the maximum feed rate is too fast and should be decreased:

- The load bar graph in the DRO display of the main menu is red, indicating excessive load on the motors
- The software is giving errors such as position errors.
- Motors are overheating.



Adjusting maximum feed rate

Manually Tune the Acceleration

Accel is the time for the axis to reach maximum velocity. An accel rate of 0.1 second is very fast, where an accel rate of 1.0 will be considered very slow.

Move the machine so that the axes are in the middle of their travel. **Make sure the real time I/O display is not showing in the main menu** (press alt + I to toggle the real time I/O display).

Press **F1-Edit Program**; adjust **PID_Collection_Moves.txt** so that it runs at the maximum feed rate as calculated above. Save changes. Press **F2-Run Program** to test out your changes. Slowly decrease the acceleration time in 0.05 increments, testing the value in-between each change. If you see any of the following symptoms the acceleration rate is too fast and needs to be slowed down:

- The acceleration rate is causing shock or vibration as the machine moves.
- The machine movement becomes bumpy, rough, or jerky.
- The machine creates unusual or loud noises such as thunks or rapping noises.
- The software is giving errors such as position errors.
- ErrAbs is unacceptably large.

Heating and Cooling

1. Heating and cooling parameters are not available for third party motors. The table below contains suggested values used for Centroid motors. Find the motor that is closest to your motor. Set the parameters as described below.
2. Since the temperature coefficients we used are the “best guess” based on your torque rating, it is necessary to run the machine at maximum feed rate and acceleration using a test program then physically measure the surface temperature of the servo motors.
3. Make sure the servo motors do not overheat. Adjust the heating and cooling coefficients if needed to get an accurate temperature estimation.
4. Overheating:
 1. If the motor occasionally overheats, adjust the values for feedrate and acceleration as needed to prevent the motor from overheating.
 2. If the motor is consistently overheating, turn the current limit down one setting using Switch1.

Servo Drive Model		16 / 17 in-lb Switch1 set to 9	29 in-lb Switch1 set to 12	29 in-lb Switch1 set to 15	40 in-lb Switch1 set to 15
Parameter	Axes	Value	Value	Value	Value
21-24 ^[1]	1-4	0.028	0.02	0.027	0.03
25-28 ^[2]	1-4	0.68	0.68	0.68	0.68
20 ^[3]	Applies to all axes	72 / 22	72 / 22	72 / 22	72 / 22
29 ^[4]		150 / 65	150 / 65	150 / 65	150 / 65
30 ^[5]		180 / 82	180 / 82	180 / 82	180 / 82

1. **Parameters 21-24** – These are the servo motor heating coefficients. A higher number will cause the CNC11 software to “estimate” the motors temperature to be a higher temperature while the motor is under load.
2. **Parameter 25-28** – There are the motor cooling coefficients. A higher number will cause the CNC11 software to “estimate” that the motor has cooled off quicker while not under load.
3. **Parameter 20** – Set to the “average” ambient temperature of the machine shop during a hot day. On system using inches as the default units, this defaults to 72°F. On systems using millimeters as the default units, this defaults to 22°C.
4. **Parameter 29** – Set to the temperature at which the CNC11 software should display the “**motor overheat warning**” software message. Using Centroid motors with inches as the default units, this setting defaults to 150°F. Using Centroid motors with millimeters as the default units, this setting defaults to 65°C.
5. **Parameter 30** – Set to the temperature which the CNC11 software should stop the machine from running due to motor overheating.. Using Centroid motors with inches as the default units, this setting defaults to 180°F. Using Centroid motors with millimeters as the default units, this setting defaults to 82°C.

Document History

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