
Deckel servo setup with linear scales 5i20 hm2.

Posted by grd246507 - 2010/04/20 11:53

Hi all

I am in the process of building / trying to set up a new control system for my deckel fp41 nc mill, which i obtained in a electrically non working state as a project to use with emc.

The hardware setup is a mesa 5i20 / 7i37 i/o and the 7i33 for the + / - 0 - 10v drive signals, from which I made a test rig with some small motors to test and learn from and make all the i / o functions handwheel, feed override hal etc work initially working on the m5i20 driver then to the new hm2 driver from which i now have most bits working from.

This is all now in the mills cabinet along with original Bocsh 20 amp velocity mode dc servo drives which are connected to the mills gettys servo motor / tachs and working on their 0 - 10v inputs and braking resistor / estop loop circuit and machines hard limit switches.

The mill has heidenhain linear scales which are decoded from their sinewave signals with heidenhain EXE 612 modules to give standard encoder

outputs that emc is reading / displaying ok, 1. the scales have reference marks at the travel ends for index homing only with no home switch which I am not yet sure how to set up in the hal file for this?.

2. I need some help / advise with the hm2 servo loop setting for the ini file settings to get the machine initially moving so it can be tuned , I am getting the joint following error come up upon enabling the drives most times I have tried some larger values for the min_ferror / ferror, some tiny moves are made resulting in a joint following error upon jogging when the the drive enables dont error upon powering up ?.

Kind Regards

Gary <http://www.linuxcnc.org/images/fbfiles/images/IMG00078.jpg>

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Re:Deckel servo setup with linear scales 5i20 hm2.

Posted by BigJohnT - 2010/04/20 17:10

Try some large joint following numbers and then use an increment jog like 0.001 per jog to see if you might have your +- backwards. If you can enable one axis at a time until you get things under control then use halscope to do the final tuning of the PID settings in hal. You also might start with a P=1 and the rest set at 0 till you can verify that it is moving the right way.

I remember the fun your fixing to have from a couple of months ago with my hardinge lathe.

John

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Re:Deckel servo setup with linear scales 5i20 hm2.

Posted by grd246507 - 2010/04/21 12:38

Hi

Thanks John i had another go today With P = 1 and have the direction of the 0 / 10v correct but it still gives the joint following error.

My unints are mm and have my input_scale set at 2000 and the output_scale at -1.0 the linear scale gives 0.0005mm per per pulse ie

2000 = 1mm which reads right on the dro, i wandered if this maybe to finer resolution ?

I tried setting the output _scale to -100.0 and opened up the min_ferror to 0.01 and ferror to 0.1 this allowed a slow continuous jog at 50mm /min, but errored at anything over that, directions correct on one enabled test axis. Started trying different P values but then it joint following errored again ?.

Not sure has anyone set up a servo machine with linear scales ?.

Regards Gary <http://www.linuxcnc.org/images/fbfiles/images/IMG00075.jpg>

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Re:Deckel servo setup with linear scales 5i20 hm2.

Posted by cmorley - 2010/04/22 15:17

Have you confirmed that the motor direction vrs encoder count direction is right?
I would increase the following error limits even more until you get it tuned a little better.
Here is a partial list of how John K does it food for thought...:
http://wiki.linuxcnc.org/cgi-bin/emcinfo.pl?Tuning_EMC2/HAL_PID_Loops

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Re:Deckel servo setup with linear scales 5i20 hm2.

Posted by grd246507 - 2010/05/01 12:32

I now have my machine moving but I cannot get it to scale / function properly in metric units.

The heidenhain EXE units give x5 or x10 fold output 0.001mm / 000.5mm per pulse in quadrature, I have these set to 0.001mm which gives
an input_scale of 1000 which gives a dro and machine movement of 1mm checked with a clock on an axis, scale correct, but the machine wont move
and gives a joint error always when set to the correct mm scale.
But say i give it an input_scale of say 10000 I can get the machine to move but at the wrong scale ie 1mm on dro / 0.1mm on the machine.

If I set the .ini units to inches and set the input_scale to 25400 ie 1000 x 25.4mm which is correct to the dro and the machines movement measured
with a clock, the machine moves great jogging at 200+ inches / min at the correct scale and with good respose, but I cannot seem to get this with the mm metric units that I want to use any ideas ?.

Regards Gary

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Re:Deckel servo setup with linear scales 5i20 hm2.

Posted by BigJohnT - 2010/05/02 11:46

Gary,

The fact that you can jog at 200IPM is good. I'm guessing your missing something when you convert to mm units in your ini or hal file. Recalling from memory (my internet is down everywhere except down here in the beer cave) that the 5i20 had some scale settings in the hal file on my Hardinge setup... but I might be full of crap too as I have slept since I've looked at my files. But anyway it sounds like your close but just have something wrong when you convert to mm...

Are you converting your input and output scale to / from in/mm?

John

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Re:Deckel servo setup with linear scales 5i20 hm2.

Posted by grd246507 - 2010/05/02 13:56

No, the input_scale is the only change, linear scale counts per machine unit for 1mm and linear scale counts per machine unit for 1inch
the output_scale set at 1 for both.

Regards Gary

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Re:Deckel servo setup with linear scales 5i20 hm2.

Posted by PCW - 2010/05/04 07:41

What I suspect is happening is that your PID tuning is changing depending on the machine units. Maybe some HAL guru can suggest:

1. How to adjust the numbers so the PID gains in mm units are the same as what you have for inches
2. Better still, how to setup PID so its machine unit independent

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Re:Deckel servo setup with linear scales 5i20 hm2.

Posted by grd246507 - 2010/06/01 15:58

Thanks for the reply, I had another go using mm units only this time with the input scale at a1000 counts and set the output scale at 25.4 this time, this gives the correct movement and moves the machine ok ,the pid needs some different values and the loop seems smoother and quieter ,but slower in response at the moment.

It seems like it needs an inch machine unit value is needed and when mm units are selected in the ini then emc converts it, I think in this case because the linear scales output is metric and a direct measurement of the machines movement in mm.

Regards Gary

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