

help3.doc 23jun92, rev 3mar93, 12dec97, 02July2001, 07Dec2006

Diagnosing Mechanical Errors using software

In normal use the system is in closed loop and there is little difference between the motor counts and the encoder counts. The controller moves the motors by a software generated count. The encoders feed back into hardware counters which are compared to the motor counts by the CPU.

“ENCODER-STEPPER MISMATCH”

If you get this error then there is either something wrong with the motor drive OR something wrong with the encoder. To find out which run the robot open loop:

Step 1

Enter

```
START  
CALIBRATE  
ENCOFF  
HOME  
CALIBRATE
```

What errors are reported from CALIBRATE? If there is a substantial error on an axis then it means there is a problem mechanically with that axis, for example: broken belt, loose pulley on a motor or other shaft etc.

If there are no substantial errors (less than, say 5 counts) then

Step 2

Enter:

```
ENCOFF  
HOME  
START  
CALIBRATE  
ENCOFF  
HOME  
WHERE
```

After this sequence of operations the counts under WHERE should show all the motor counts as zero. The second line displays the actual encoders, ignore these. The third line displays the converted encoder count i.e. what the motor should be according to the encoders. Ideally these should also be zero or else just a few counts out. Any substantial error means there is a fault with the encoder.

Diagnosing mismatch in an application

Note: the test program is an application in this sense.

It might be that it takes a while for ENCODER STEPPER MISMATCH to appear. The above diagnostics then show no error in step 1 or step 2. Errors are corrected if TRIES is 1 or more.

Step 1

Enter

0 TRIES !

and run the program. Check that the program does not contain the word START or 1 TRIES !.

If it does then modify the program with the line

0 TRIES !

If the word START is in the program this line should come after START.

Step 2

Then run program again. As soon as ENCODER STEPPER MISMATCH comes up immediately type

ENCOFF

HOME

If there are any errors on the bottom line make a note of size and axis.

Step 3

The enter

CALIBRATE

If there are any errors reported then compare them to the numbers in step 2. If they are similar and same axis then the problem is the motor.

Possible problems:

Slipping pulley

Pulley rubbing on motor or on casing or on another pulley.

Damaged belt.

If the CALIBRATE errors are zero then the motor and transmission were fine and the error lies with the encoders.

Possible problems:

Bad mesh of encoder pulley into the belt.

Faulty encoder (rare)