

Measuring Each Axis Pitch and Backlash Test

Set Gibs and Run autotune.

As you are attempting to improve your machines accuracy you should test and set the gibs of the machine before you set Pitch and lash. See these instructions and do them before setting Pitch and lash. A clean machine runs better than a filthy dirty one.

Introduction

There are as many ways of measuring Pitch & Backlash, This way we can check both pitch and backlash in one setup and test for each axis. This method has served me well for cutting speeds and conditions that the Centroid control will provide.

Procedure

1) Set up a simple indicator in the spindle of the machine. I use a drill chuck and a StarritLast Word indicator. Use what you have.

2) Mount a square on the table of the machine. Tram it and make sure it is straight and square. We will be setting XYZ Zero at the left end Point (Z) and moving to the left to stop against the Square surface.

XXXXXXXXXXXXX	X is the T Square	O is the 6" Gil Block
XOOOOOOOOO(Z)	Z is the Zero start point	
X		
X		
X		
X		

3) X Axis Test: Place a 6 inch gil block as shown for the X axis test.

You can use some Blue Painters tap to hold it in place. There is no pressure on the block so tape is fine in this application. Clamp it if you want.

4) Next Jog the indicator XY&Z to the start point. Jog X in – stop at a number, then set XY&Z Zero at this point. This is the Starting point for our program.

Create and load a program similar to this: In Intercon or the editor.

Note: If made in intercon – Block out the Z move to home. Insert (;) on the G28 line.

```
G00 Z.500
X2.0 Y0
Z0
X0
G4 X1.0 ; Dwell to check indicator at start point
Y-.5
X-6.0
G4 X1.0 Dwell to check indicator at (Pitch check)
X0
Y0
G4 X1.0 Dwell to check indicator at (Backlash check)
M102 Automatically restarts the program. Press [Red] Cancel to stop.
```

I let this program run a few times, press (Feed Hold) and tweak the indicator if you want.

Use the chart below to record your starting point data. It is always good to have the original data on hand if you need to refer to it later.

You want to remove the Lash before you start = Set Lash = 0.

We want to get the pitch set before we set lash – it values will mess your test up, if you don't!

	X Axis Pitch	Lash	Result
Original #'s			Starting Point Data
Test #1		0.0	
Test #2		0.0	
Test #3		0.0	
Test #4		0.0	
Test #5			
Test #6			

Where to find the Pitch and Backlash compensation amounts.

In recent software versions (anything since 2003 or so):

Press F7/Utility

Press F6/User Maint

Press F2/Lash

Edit the desired Pitch and last insert a backlash compensation value

Press F10/Save

Press ESC as needed to return to the main screen to run the program

In older software versions (pre-2003):

Press F1/Setup

Press F3/Config

Enter the configuration password (usually "137")

Press F2/Machine

Press F2/Motor

Arrow over to the Lash Comp column

Edit the desired backlash compensation value

Press F10/Save

Press ESC as needed to return to the main screen

What if the needle overshoots, but the backlash compensation is already zero?

This usually means that there is some backlash, but that the axis is tending to "coast" into the backlash range after the servo motor comes to a stop. You can reduce this by making the stop more gradual.

Either decrease the Deadstart value on the Machine Configuration -> Jog Parameters screen, or increase the Accel Time value on the PID Configuration -> PID Parameters screen.

Y Axis testing.

The same basic test, but you are moving the Gil block to the Y axis of the square.

```
XXXXXXXXXXXXX
XO
XO      X = T square      O = 6" GilBlock
XO      (Z) XYZ Zero point
XO
XO
X(Z)
```

Program as before in Intercon or in the editor.

```
G00 Z.500
X2.0 Y0
Z0
Y0
G4 X1.0 ; Dwell to check indicator at start point
X.5
Y 6.0
G4 X1.0 Dwell to check indicator at (Pitch check)
Y0
X0
G4 X1.0 Dwell to check indicator at (Backlash check)
M102 Automatically restarts the program.Press [Red] Cancel to stop.
```

	Y Axis Pitch	Lash	Result
Original #'s			Starting Point Data
Test #1		0.0	
Test #2		0.0	
Test #3		0.0	
Test #4		0.0	
Test #5			
Test #6			

Z Axis testing.

Do the same basic test for the Z axis. If you need support for this program call us. You can blue tape the Gil block to the table on 1 side. Support it as needed.