Procedure for belt tensionning on the Vcore3

Evolution

Rédacteur	Responsable X	Qualité
FBR	FBR	FBR

Indice	Date	Description de l'évolution	Auteur
0.0	11/02/2022	Création	FBR

This preocedure is made upon the work of Eddietheengineer, help and tests realized with John Beima.

What is needed :

-A Vcore or another printer with GT2 genuines Gates belts

-Android phone with Spectroid / Sonic tension-meter 508C type

-Sheet for Gates calculation with Gates values

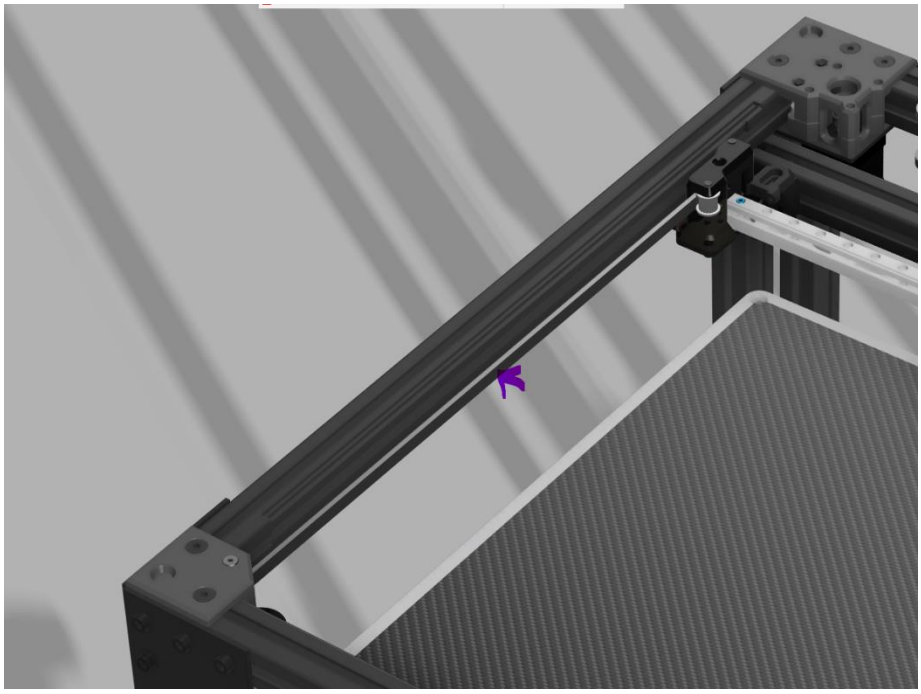
-A ruler

-15min of you time

If you want to skip to the calculated Values go to the last parts 😉

1-What we want to measure ?:

Put your X gantry to the Y endstop, We want to measure the frequency of the belt section here, and get the L lenght of it, center to center of the pulleys



1-Checking GATES values

Table 8 – Static Belt Tension – General Values T_{st} (lb) Per Span

PowerGrip® GT®3 Belt Widths

Section	4 mm	6 mm	9 mm	12 mm	15 mm	20 mm	25 mm
2MGT GT3	6	10	17	24	-	-	-
3MGT GT3	-	14	24	33	43	61	-
5MGT GT3	-	-	27	38	50	70	91

PowerGrip HTD Belt Widths

3M	-	6	9	13	17	25	-
5M	-	-	10	-	19	26	34

PowerGrip Timing Belt Widths

Section	1/8"	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"
MXL	2	3	4	4	5	-	-
XL	-	-	5	6	7	8	10

Aim is to reach 6Lb on those 9mm belts

2-Calculations

The formula used is :

$$f_0 = \frac{1}{2L}\sqrt{\frac{F}{\mu}}$$

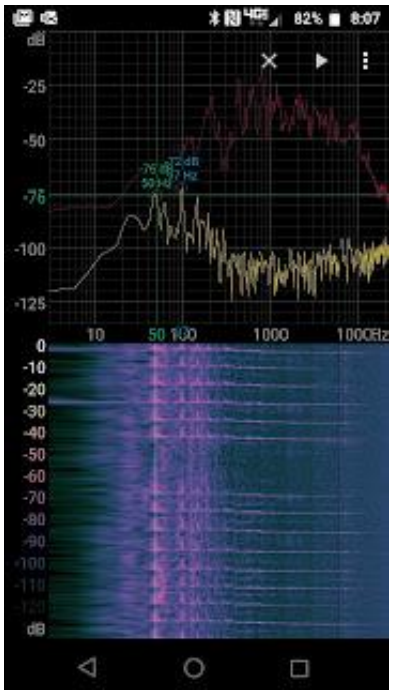
L is the value you have to find one your machine, theorically you aim to check the longest lenght, In the Vcore we will use the previous displayed one for convenience of testing.

In the rows concerned about the 9mm GT2 belt in the link below you will have to enter the lenght measured, Typically 430 for a V400 for instance.

We want to look at the calculation made to get a frequency range. Here between +-65-75Hz

3-Frequency tuning :

We will use Spectroid here. Got and pinch the belt at the middle, try to maque a repetitive pinch to get a ponderate value



We want to look at the first occurrence, displayed at a certain frequency

Then tune the tensionner to reach the range previously calculated

Repeat it on the othe side

Don't forget we have a 10Hz margin, assuming the frame is squared, and you still need to make a slight variation to accomodate a fine tuning for the Octogon calibration to reach perfect Rotation_Distance values.

4-Disclaimer :

This guide was made after long researchs and tests, considering input shaping, tension, XY accuracy. I thing it is the best way to reach every objectives. If someone get other intel or methods that goes against this one, I will be glad to discuss it.

5-Final values :

Vcore3 300mm

86-100Hz

Vcore3 400mm

66-75Hz

Vcore3 500mm

53-61Hz

8 Useful links :

https://en.wikipedia.org/wiki/String_vibration

https://www.gates.com/content/dam/gates/home/knowledge-center/resource-library/catalogs/light-power-and-precision-manual.pdf

https://www.youtube.com/watch?v=FoOMxGOeNvs&t

https://github.com/eddietheengineer/documentation/tree/master/belt_tension/data

Special thanks to the amazing work of Eddietheengineer to bring clear and deep explanation for that kind of advanced tuning features