Output torque:

Rotational speed:

Power:

Motor and Gearbox Selection:

Key load parameters:

|  |  |  |
| --- | --- | --- |
| Output Torque [Nm] | Rotational Speed [rpm] | Power [W] |
| 25 | 30 | 78.54 |

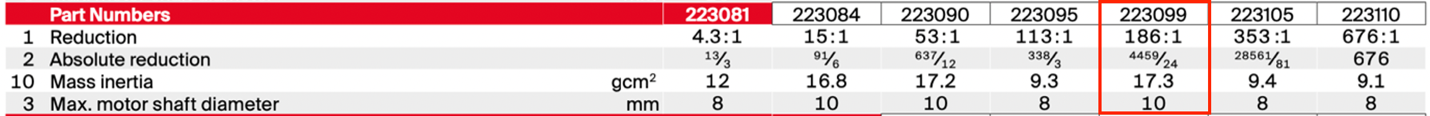
We firstly select the gear box that can allow 25 [Nm] output torque from company Maxon. From the product catalogue [See Appendix], we select the gearbox Planetary Gearhead GP 52 C.

A drawing of a mechanical part

Description automatically generated with medium confidence

A black and white informational chart

Description automatically generated with medium confidence



A drawing of a machine

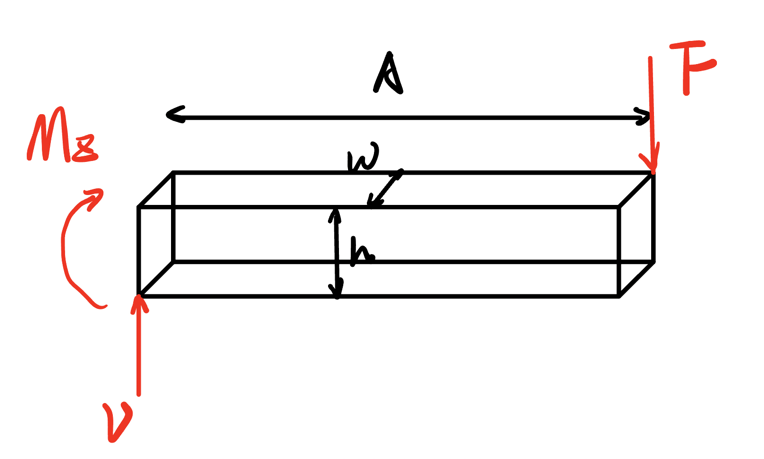
Description automatically generated

Free body diagram:

A drawing of a machine

Description automatically generated

Force analysis:



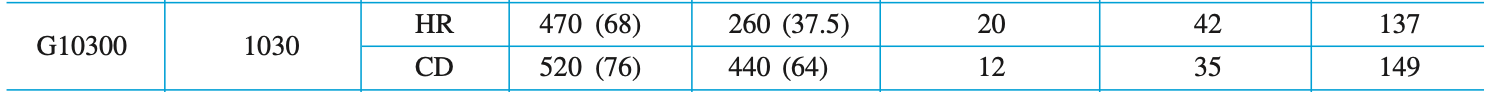
where is the magnification factor.

Force Diagram:

Point D is the critical point since the bending moment at this point is highest and there is a stress concentration of the guide rail.

The internal moment and the shear force at the critical point:

Let’s choose G10300 HR steel as the material from Shigley’s book Table A-20, the properties:



Dimension of the beam:

Thickness: h = 0.015 m

Width: b = 0.015 m

Let’s check for the yielding:

Choose the safety factor as

Bending stress:

Normal:

Shear:

Since it’s a ductile material, choose Distortion-energy criterion:

Thus, the beam will not yield.

**Appendix:**

A graph of a number of numbers

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