銀泰科技股份有限公司
PRECISION MOTION INDUSTRIES, INC.
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Certificate FM 521769 ISO 9001
Certificate EMS 521770 ISO 14001

I.Design Conditions:

Direction for mounting: Cutting Machine
Work weight: 1900 kgf
Max. travel: 1000 mm
Rapid feed speed: 14 m/min
Require life: 25000 hr
Guiding surface friction coefficient: u = 0.01
Driving motor: 2000 rpm
Lead: 10 mm
Method for mounting: supported-supported

II.Motion Conditions:

Motion	Axial load(kgf)	Rotation speed(rpm)	Time(%)
1	1	1	1

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III.Mean rotation and mean load:

Mean load:

$$F_m = \left(\sum_{i=1}^{n} \frac{\left| F_i^3 \cdot n_i \cdot t_i \right|}{n_i \cdot t_i} \right)^{\frac{1}{3}} = 1.00 \text{ (kgf)}$$

Mean rotation:

$$N_m = \sum_{i=1}^{n} \frac{n_i \cdot t_i}{T} = 1 \text{ (rpm)}$$

IV.Calculation dynamic rate load:

Load factor f_w = 1.19

$$C_a = (60 N_m \cdot L_t)^{\frac{1}{3}} \cdot F_m \cdot f_w \cdot 10^{-2} = 1.36 \text{ (kgf)}$$

V.Selecting the type of nut:

Specification:

Ball Dia.: ϕ mm

Dynamic Load rate Ca: kgf

Static Load rate Coa: kgf

Length of nut: mm

VI.Calculation of life:

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VII.Permissible rotational speed:

f = 9.7

dr = P.C.D - Ball dia.= (mm)

L = Max. travel + Nut length + Unthreaded area length = (mm)

$n = f \times dr / L^2 \times 10^7 =$ *(rpm) < 1400 (rpm)*

(Dangerous)

VIII.Permissible Axial Load:

m = 5.1

$P = m \times dr^4 / L^2 \times 10^3 = 0$ *(kgf) > (kgf)...(safe)*

The result is the theoretical calculation which according to supply conditions. When actual used, because of environment, lubrication conditions or stiffness difference, it maybe presents the different results.

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R&D Dept.