Orientalmotor

Call 1-800-GO-VEXTA(468-3982) or 1-847-871-5931

Print

- given information -

Table shape and dimensions

Table type	= Round Table	
Diameter	D = 6	[in]
Width	A =	[in]
Depth	B =	[in]
Weight	W = 2	[lb]
Thickness	t =	[in]
Material	ρ =	[oz/in ^{3}]

Drive shaft dimension

Shaft diameter	D_2 = .25	[in]
Shaft weight	W_2 = .1	[lb]
Shaft length	L =	[in]
Shaft material	ρ_2 =	[oz/in ^{3}]

Load shape and dimensions

Load type	Rectangular pillar type	
Diameter	D_1 =	[in]
Width	A_1 = 1	[in]
Depth	B_1 = 3	[in]
Distance from the table center to the load center	r = 3	[in]
Number of loads	n = 1	pc

Load weight	W_1 = .5	[lb]
Load height	h_1 =	[in]
Load material	ρ_1 =	[oz/in ^{3}]

Table support

Friction coefficient between the table and the supporting mechanism	μ = 0.05	
Distance from the table center to the supporting mechanism	l = .5	[in]
System efficiency	η = 70	%

Mechanism Condition

Mechanism Condition — Horizontal operation

Other requirement(s)

Is it necessary to hold the load even after the power supply is turned off? → NO

Is it necessary to hold the load after the motor is stopped, but not necessary to hold after the power supply is turned off? → NO

Operating conditions

Variable speed operation	Operating speed	V_1 =	1	[r/min]
		V_2 =	5	[r/min]
	Acceleration / deceleration time	t_1 =	100	[s]

Stopping accuracy

Stopping accuracy	± Δθ =	200	°
	± Δl =		[in]

Safety factor

Safety factor S·F = 1.5

- calculated result -

Load Inertia

J_t = (1/8) (w × 16) × D^2

= (1/8) (2 × 16) × 6 ^{2} = 144 [oz·in ^{2}]

J_S = (1/8) (W_2 × 16) × D_2^2

= (1/8) × (.1 × 16) × .25 ^{2} = 1.2500e-2 [oz·in ^{2}]

J_1 = (1/12) (W_1 × 16) × (A_1^2 + B_1^2 + 12 × r^2) × n

= (1/12) (.5 × 16) × (1 ^{2} + × 3 ^{2} + 12 × 3 ^{2}) × 1 = 78.67 [oz·in ^{2}]

J_L = J_t + J_s + J_l

= (144 + 1.2500e-2 + 78.67) = 222.7 [oz·in ^{2}]

Required Speed

V_{m1} = V_1

= 1 = 1 [r/min]

V_{m2} = V_2

= 5 = 5 [r/min]

Required Torque

T = (T_a + T_L) (Safety Factor)

= (1.8877e-4 + 8.9286e-2) × 1.5 = 0.1342 [lb·in]

= 2.147 [oz·in]

Acceleration Torque

T_a = (J_L / 386) (V_m / (9.55 × t_1)) (1 / 16)

= (222.7 / 386) × (5 / (9.55 × 100)) × (1 / 16) = 1.8877e-4 [lb·in]

= 3.0204e-3 [oz·in]

Load Torque

W_T = W

= 2 = 2 [lb]

W_1 = $w_1 \times n$

= .5 × 1 = 0.5000 [lb]

T_L = $(W_T + W_1)\ \mu\ (1 / (\eta \times 0.01))$

= (2 + 0.5000) × 0.05 × .5 × (1 / (70 × 0.01)) = 8.9286e-2 [lb·in]

= 1.429 [oz·in]

Required Stopping Accuracy

Δθ = Δθ

= 200 = 200 [deg]

Other requirement(s)

- end of the report -