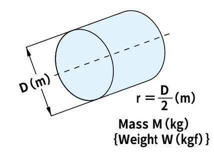
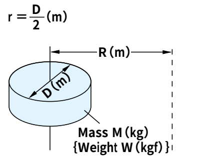
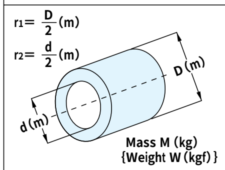
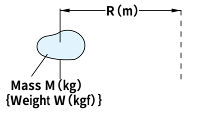
Calculation of Inertia Moment I (GD² (Flywheel Effect)

The conversion between the inertia moment(kg·m²)-(SI units) and the gravimetric units GD² (kg·m²) are calculated as follows:

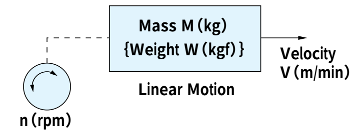
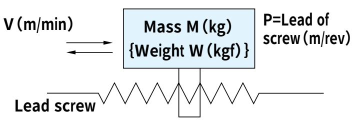
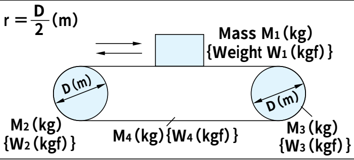
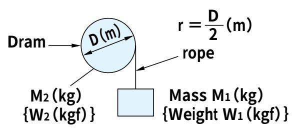
$$I = \frac{GD^2}{4}$$

- G : Gravity (kgf)
- D : Rotation Diameter (m)
- I : Inertia Moment (kg·m²)

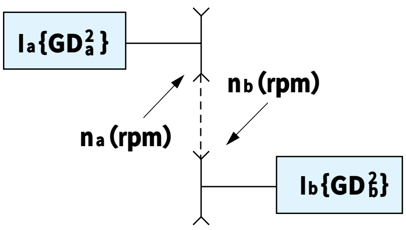
■Inertia Moment in Rotation {GD²}

When the center of rotation is concentric with the center of gravity			When the center of rotation is not concentric with the center of gravity		
	SI Unit	Gravimetric Unit		SI Unit	Gravimetric Unit
	$I = \frac{1}{2}Mr^2$ (kg·m²)	$GD^2 = \frac{1}{2}WD^2$ {kgf·m²}		$I = \frac{1}{2}Mr^2 + MR^2$ (kg·m²)	$GD^2 = \frac{1}{2}WD^2 + 4WR^2$ {kgf·m²}
	$I = \frac{1}{2}M(r_1^2 + r_2^2)$ (kg·m²)	$GD^2 = \frac{1}{2}W(D^2 + d^2)$ {kgf·m²}		(when you can ignore size) $I = MR^2$ (kg·m²)	(when you can ignore size) $GD^2 = 4WR^2$ {kgf·m²}

■Inertia Moment in Linear Motion {GD²}

		SI Unit	Gravimetric Unit
Ordinary Use		$I = \frac{1}{4}M\cdot\left(\frac{V}{\pi\cdot n}\right)^2$ (kg·m²)	$GD^2 = W\cdot\left(\frac{V}{\pi\cdot n}\right)^2$ {kgf·m²}
Horizontal Linear Motion (driven with lead screw)		$I = \frac{1}{4}M\cdot\left(\frac{P}{\pi}\right)^2 = \frac{1}{4}M\cdot\left(\frac{V}{\pi\cdot n}\right)^2$ (kg·m²)	$GD^2 = W\cdot\left(\frac{P}{\pi}\right)^2 = W\cdot\left(\frac{V}{\pi\cdot n}\right)^2$ {kgf·m²}
Horizontal Linear Motion (conveyors, etc.)		$I = M_1r^2 + \frac{1}{2}M_2r^2 + \frac{1}{2}M_3r^2 + M_4r^2$ (kg·m²)	$GD^2 = W_1D^2 + \frac{1}{2}W_2D^2 + \frac{1}{2}W_3D^2 + W_4D^2$ {kgf·m²}
Vertical Linear Motion (cranes, winches, etc.)		$I = M_1r^2 + \frac{1}{2}M_2r^2$ (kg·m²)	$GD^2 = W_1D^2 + \frac{1}{2}W_2D^2$ {kgf·m²}

■Conversion of Inertia Moment when Speed Ratio is available



The inertia moment I_b (GD_b^2) of the load can be converted into the equivalent value at the n_a shaft as shown below:

$$I = I_a + \left(\frac{n_b}{n_a}\right)^2 \times I_b$$

$$\left\{GD^2 = GD_a^2 + \left(\frac{n_b}{n_a}\right)^2 \times GD_b^2\right\}$$

Parallel Shaft (Performance Table/Dimension)
Gearmotor with Brake
Water-resistant, Outdoor Gearmotor with Brake
Gearmotor with Clutch/Brake
Reducer (Double Shaft)
S-Type Reducer
Right Angle Shaft (Performance Table/Dimension)
Gearmotor with Brake
Water-resistant, Outdoor Gearmotor with Brake
Gearmotor with Clutch /Brake
Reduce (Double Shaft)
S-Type Reducer
Hollow Shaft Solid Shaft Performance Table/Dimension
Gearmotor with Brake
Water-Resistant, Outdoor Gearmotor with Brake
Reduce (Double Shaft)
S-Type Reducer
Concentric Hollow Shaft Concentric Solid Shaft Performance Table/ Dimension
Gearmotor with Brake
Water-Resistant, Outdoor Gearmotor with Brake
Reducer (Parallel Shaft)
S-Type Reducer
Technical Information
Standard Motors
Cautions for Safety
Option
GT-STEP Index Gearmotor
KOMPASS Gearbox