

Technical Note

Sample Calculation for Gearmotor with Brake/Gearmotor with Clutch/Brake

	SI Unit	Gravimetric Unit	Notes
Braking Time • Gearing Time of Clutch (ttb)	$t_{tb} = t_{ab} + t_a \text{ [s]}$ $t_{ab} = \frac{(I_r + I_l) \times n}{9.57 \times (T_d \pm T_l)} \text{ [s]}$	$t_{tb} = t_{ab} + t_a \text{ [s]}$ $t_{ab} = \frac{(GD_r^2 + GD_l^2) \times n}{375 \times (T_d \pm T_l)} \text{ [s]}$	<p>Note ① When the load torque become negative such as winding down, T_l should be $(-T_l)$.</p> <p>② For the mark $r \pm j$, Clutch should be $r - j$ and Brake should be $r + j$.</p>
Geared Total Work(E)	<p>Geared Total Work(E) of clutch brake or brake</p> $E = \frac{(I_r + I_l) \times n^2}{183} \times \frac{T_d}{T_d \pm T_l} \text{ (J)}$	$E = \frac{(GD_r^2 + GD_l^2) \times n^2}{7160} \times \frac{T_d}{T_d \pm T_l} \text{ (kgf \cdot m)}$	<p>Note ① When the load torque become negative such as winding down, T_l should be $(-T_l)$.</p> <p>② For the mark $r \pm j$, Clutch should be $r - j$ and Brake should be $r + j$.</p>
Life	<p>The life of clutch/brake lining varies according to surface pressure, temperature, slip speed, etc. Therefore, it is not possible to obtain exact value, however, the round number of life-time braking frequency can be estimated by the following formula:</p> $Z = \frac{E_{max}}{E} \text{ [times of braking]}$		
<p>【Explanations of Code】</p> <p>t_a Brake delay time of gearmotor with brake Refer Table-15 on page E21</p> <p>Armature braking time of gearmotor with clutch/brake Refer Table-16•17 on page E40</p> <p>$I \{ GD^2 \}$ Gearmotor with brake Refer Table-8-1 or Table-8-2 on page E14</p> <p>Gearmotor with clutch/brake Refer Table 9 or 10 on page E14</p> <p>$I \{ GD_l^2 \}$ Inertia Moment of load I Motor shaft or reducer Input Shaft Equivalent of $(GD^2) \{ \text{kg} \cdot \text{m}^2 \}$ $\{ \text{kgf} \cdot \text{m}^2 \}$</p> <p>$n$ Rotation speed of clutch shaft or brake shaft (rpm)</p> <p>T_d Dynamic friction torque against the corresponding rotation speed of clutch/brake $(\text{N} \cdot \text{m} \}$ $\{ \text{kgf} \cdot \text{m} \}$</p> <p>Gearmotor with brake Refer Table-13-1 or Table-13-2 on page E18</p> <p>Gearmotor with clutch/brake Refer Table-16•17 on page E40</p> <p>T_l Equivalent load torque converted to reducer input shaft $(\text{N} \cdot \text{m} \}$ $\{ \text{kgf} \cdot \text{m} \}$</p> <p>$E_{max}$ Allowable total work (J) $(\text{kgf} \cdot \text{m})$ of clutch/brake</p> <p>Gearmotor with clutch Refer Table-13-1 or Table-13-2 on page E18</p> <p>Gearmotor with clutch/brake Refer Table-16•17 on page E40</p>			

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

Reducer (Double Shaft)

S-Type Reducer

Hollow Shaft Solid Shaft Performance Table/Dimension

Gearmotor with Brake

Water-resistant, Outdoor Gearmotor with Brake

Reducer (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