

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

	SI Unit	Gravimetric Unit	Notes
Braking Time· Gearing Time of Clutch (ttb)	$t_{tb} = t_{ab} + t_a \text{ [S]}$ $t_{ab} = \frac{(I_r + I_l) \times n}{9.57 \times (T_d \pm T_l)} \text{ [s]}$	$t_{tb} = t_{ab} + t_a \text{ [S]}$ $t_{ab} = \frac{(GD_r^2 + GD_l^2) \times n}{375 \times (T_d \pm T_l)} \text{ [s]}$	Note ① When the load torque become negative such as winding down, T_l should be $(- T_l)$. ② For the mark $r \pm j$, Clutch should be $r - j$ and B rake should be $r + j$.
Geared Total Work(E)	Geared Total Work(E) of clutch brake or brake $E = \frac{(I_r + I_l) \times n^2}{183} \times \frac{T_d}{T_d \pm T_l} \text{ (N}\cdot\text{m)}$	$E = \frac{(GD_r^2 + GD_l^2) \times n^2}{7160} \times \frac{T_d}{T_d \pm T_l} \text{ (kgf}\cdot\text{m)}$	Note ① When the load torque become negative such as winding down, T_l should be $(- T_l)$. ② For the mark $r \pm j$, Clutch should be $r - j$ and B rake should be $r + j$.
Life	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: $Z = \frac{E_{max}}{E} \text{ [times of braking]}$		

【Explanations of Code and Referring Page, Table, Fig. No.】

- t_a Brake delay time of gearmotor with brake to below chart Referring
- Armature braking time of gearmotor with clutch/brake to below chart Referring
- $I \{ GD_r^2 \}$ Gearmotor with brake to below chart Referring
- Gearmotor with clutch/brake to below chart Referring
- $I \{ GD_l^2 \}$ Inertia Moment of load I Motor shaft or reducer Input Shaft Equivalent of $(GD^2) \{ \text{kg}\cdot\text{m}^2 \} \{ \text{kgf}\cdot\text{m}^2 \}$
- n Rotation speed of clutch shaft or brake shaft (rpm)
- T_d Dynamic friction torque against the corresponding rotation speed of clutch/brake ($\text{N}\cdot\text{m}$) ($\text{kgf}\cdot\text{m}$) }
 Gearmotor with brake to below chart Referring
 Gearmotor with clutch/brake to below chart Referring
- T_l Equivalent load torque converted to reducer input shaft ($\text{N}\cdot\text{m}$) ($\text{kgf}\cdot\text{m}$) }
- E_{max} Allowable total work ($\text{N}\cdot\text{m}$) ($\text{kgf}\cdot\text{m}$) of clutch/brake
 Gearmotor with clutch to below chart Referring
 Gearmotor with clutch/brake to below chart Referring

【Referring Page, Table and Fig. No.】

Designation	Model	GTR Mini Series			GTR-L Series
		G·H·F2 Type	G·H·F2 Type (Water-Resistant)	GT Type	G Type
t_a	With brake	P.E37·Table-19	P.E47·Table-21	P.E37·Table-19	P.E37·Table-19
	With Clutch/brake	G-Type only P.E74·Table-24	—	—	—
$I \{ GD_r^2 \}$	With brake	P.E26·Table-8 ~ 9	P.E26·Table-8 ~ 9	P.E27·Table-10 ~ 11	P.E27·Table-12 ~ 13
	With Clutch/brake	G-Type only P.E28·Table-14	—	—	—
T_d	With brake	P.E34·Table-17	P.E44·Table-20	P.E34·Table-17	P.E34·Table-18
	With Clutch/brake	G-Type only P.E74·Table-24	—	—	—
E_{max}	With brake	P.E34·Table-17	P.E44·Table-20	P.E34·Table-17	P.E34·Table-18
	With Clutch/brake	G-Type only P.E74·Table-24	—	—	—