Pin gear drive unit selection formulae－For drum drives

Drum diameter : Dd[mm]

Total weight : Mt[kg]

Drum rotational speed : n_2[r/min]

Rotational support diameter : Ds[mm]

Coefficient of bearing friction in the rotational support area : μs

Coefficient of rolling friction in the rotational support area : μr

Workload force : Fg[kN]

Work radius : Rg[mm]

Acceleration and deceleration time : t[s]

Total load moment of inertia : $It = Mt \cdot \left(\frac{Dd}{2000}\right)^2$ [kg · m^2]

Acceleration and deceleration inertia torque : $Ta = \frac{\pi \cdot It \cdot n_2}{30000 \cdot t}$[kN · m]

Friction torque : $Tf = \frac{1.15 \cdot 9.8}{2 * 10^6} \cdot Mt \cdot (\mu s + \mu r) \cdot Ds$[kN · m]

Anticipate an additional 15% reactive force on the friction torque depending on the angle of rotational support roller placement.

Work torque : $Tg = \frac{Fg \cdot Rg}{1000}$[kN · m]

Total load torque : $Tw = Ta + Tf + Tg$[kN · m]

Tangential load : $Fw = \frac{2000 \cdot Tw}{Dpw}$[kN]

Tangential velocity : $Ve = \frac{\pi}{1000} \cdot Dpw \cdot n_2$[m/min]

Service factor : Ks Select from the following table

Speed factor : Kv Select from the following table

Corrected tangential load : $Ft = Ks \cdot Kv \cdot Fw$[kN]

Allowable tangential load : Fp[kN] Consult the Tsubaki catalog

Pitch : P[mm]

Pin gear no. of teeth : NT_1

No. of rollers : NT_2

Pin gear pitch diameter (approximation) : $Da \approx \frac{P \cdot NT_1}{\pi}$[mm]

Consult the Tsubaki catalog for definite values.

Pin wheel pitch diameter : $Dpw = \frac{P \cdot NT_2}{\pi}$[mm]

Pin gear rotational speed : $n_1 = \frac{NT_2}{NT_1} \cdot n_2$[r/min]

Pin gear load power : $Pw = \frac{\pi}{30} \cdot Tw \cdot n_2$[kW]

Service factor *Ks*

Operation type	Operating time (hrs/day)		
	Less than 3 hours	Less than 12 hours	More than 12 hours
Uniform load	1.00(1.25)	1.15(1.40)	1.25(1.50)
Load with minor impacts	1.25(1.50)	1.40(1.70)	1.60(2.00)
Load with major impacts	1.50(1.80)	1.75(2.15)	2.00(2.50)

Use the values inside the parentheses if the equipment is started/stopped more than 10 times per hour.

Speed factor *Kv*

Tangential velocity [m/min]	Less than 10	Between 10 and 15	Between 15 and 20	Between 20 and 25	Between 25 and 30	Between 30 and 35	Between 35 and 40	Between 40 and 50	50
Speed factor	1.02	1.04	1.05	1.06	1.06	1.07	1.08	1.1	1.2