Overhung Load & Thrust Loads

An overhung load exists when a force is applied at right angles to a shaft beyond the shaft's outermost bearing. Pulleys, sheaves and sprockets will cause an overhung load when used as a power take-off. The amount of overhung load will vary, depending on the type of power take-off used and its mounting location on the shaft. The Bravo® Overhung Load ratings listed in this catalog are calculated at the centerline of the shaft.

Overhung load ratings are listed for each reducer size and should not be exceeded. If the basic reducer is selected using a service factor, that factor must also be used in the equations below.

Output Shaft OHL =

$$\frac{\text{126000 x Motor HP x Output HP Rating x Overhung Load Factor}}{\text{Pitch Diameter (of sprocket, pulley or sheave) x Input HP Rating x Output RPM}}$$

Input Shaft OHL =

$$\frac{\text{126000 x Motor HP x Overhung Load Factor}}{\text{Pitch Diameter (of sprocket, pulley or sheave) x Input RPM}}$$

Overhung Load Factors—

Sprocket	1.00
Gear Pinion	1.25
V-Belt Sheave or Pulley	1.50
Flat Belt	2.50

Torque and Horsepower

Torque as it is related to gear reducers is defined as a twisting motion resulting in rotational movement. Horsepower is a measure of the rate of doing work, and depends on speed of rotation and the radius of rotation.

$$TQ_{(In\text{-}lb)} = \frac{(HP \times 6325)}{RPM} \qquad HP_{(Rotational)} = \frac{TQ_{(In\text{-}Lb)} \times RPM}{63025}$$

$$TQ_{(ft\text{-}lb)} = \frac{(HP \times 5252)}{RPM} \qquad HP_{(Rotational)} = \frac{TQ_{(ft\text{-}lb)} \times RPM}{5252}$$

$$TQ_{(In\text{-}lb)} = W \times R \qquad HP_{(Linear)} = \frac{W \times V}{33000}$$

Efficiency

The efficiency of a Worm Gear Speed Reducer is dependent on input speed, lead angle of the worm, type of lubricant, ambient temperature and many other variables. The efficiency for speed reducer can be easily calculated as follows.

$$Efficiency_{(Total)} = Eff_1 + Eff_2 + Eff_3$$

Additional Engineering Equations and Conversion Factors

Velocity(FPM) = V = .2618 x D x RPM

Rotational Speed = RPM = $\frac{V}{(.2618 \times D)}$

$$\text{Ratio} = \frac{\text{Input RPM}}{\text{Output RPM}} = \frac{\text{No. Teeth in Driver}}{\text{No. Teeth in Driven}} = \frac{\text{Diameter of Driver}}{\text{Diameter of Driven}}$$

Ratio(Total) = $Ratio_1 + Ratio_2 + Ratio_3$

1 inch = 25.4 MM
1 lb = 4.448 N
1 in-lb = .11298 Nm
1HP = 746 Watts = .746 kW
1kW = 1.34 HP
°F = 9/5 x °C + 32
°C = 5/9 x (°F - 32)

Where:
D = Diameter (inches)
HP = Horsepower
R= Radius (inches)
RPM - Rotational Speed
TQ = Torque
V = linear velocity (FPM)
W = force or tension (lbs)