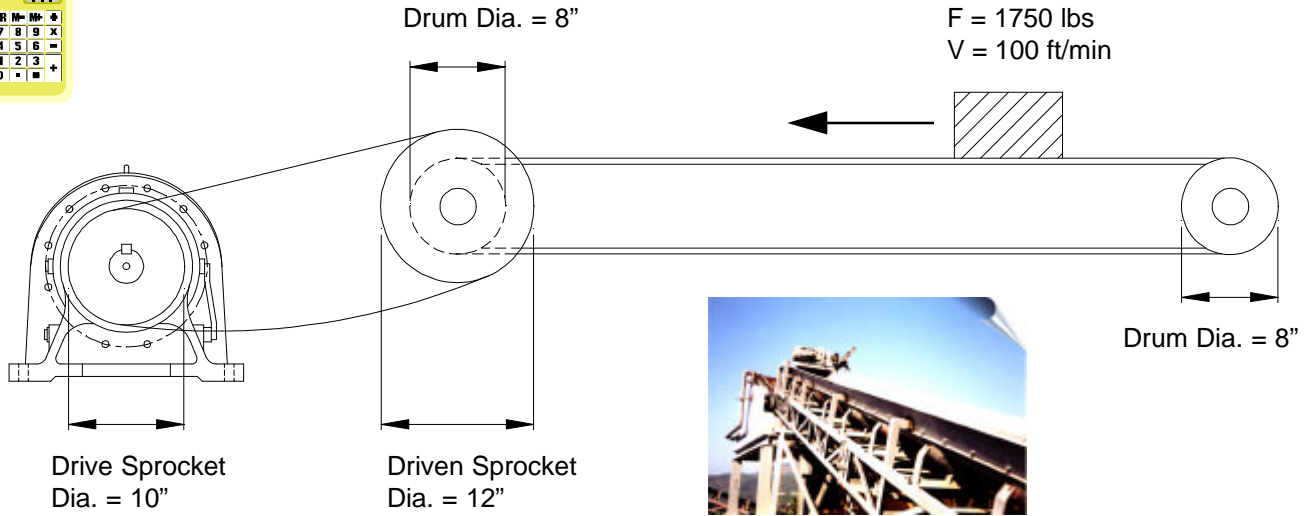


Sizing Example



You are designing a conveyor driven by a gearmotor. The conveyor has a 1750 lbs force acting on it, and moves at the speed of 100 feet per minute. This conveyor will operate at 10 hours per day with moderate shock load. Please select the appropriate DARALI®DRIVES frame size and reduction ratio.

1). Find the output torque requirement at the output shaft of DARALI®DRIVE:

$$\text{Torque}_{\text{drum}} = \text{Torque}_{\text{driven sprocket}} = \text{Force} \times \text{Radius}_{\text{drum}} = 1750 \text{ lb} \times (8 \text{ inch} / 2) = 7000 \text{ inch-lbs}$$

$$\text{Torque}_{\text{output shaft}} = \text{Torque}_{\text{drive sprocket}} = \text{Torque}_{\text{driven sprocket}} \times (\text{Diam}_{\text{drive sprocket}} / \text{Diam}_{\text{driven sprocket}})$$

$$\text{Torque}_{\text{output shaft}} = 7000 \text{ inch-lb} \times (10 \text{ inch} / 12 \text{ inch}) = \mathbf{5833 \text{ inch-lbs}}$$

2). Find the rpm at the output shaft of DARALI®DRIVE:

$$100 \text{ ft/min} \times 12 \text{ inch/ft} = 1200 \text{ inch/min} \text{ (speed of conveyor in inch/min).}$$

$$\text{Each time the drum turns 1 revolution, the conveyor moves } (8 \text{ inch} \times 3.14) = 25.12 \text{ inch}$$

How many rpm does the drum have to turn so the conveyor will move 1200 inch/min?

$$\text{RPM}_{\text{drum}} = (1200 \text{ inch/min}) / (25.12 \text{ inch/rev}) = 47.77 \text{ rpm, which is also RPM}_{\text{driven sprocket}}$$

Note: The driven sprocket and drum turn at the same RPM

$$\text{RPM}_{\text{drive sprocket}} = \text{RPM}_{\text{driven sprocket}} \times (\text{Diam}_{\text{driven sprocket}} / \text{Diam}_{\text{drive sprocket}})$$

$$\text{RPM}_{\text{drive sprocket}} = 47.77 \text{ rpm} \times (12 \text{ inch} / 10 \text{ inch}) = \mathbf{57.32 \text{ rpm}}, \text{ which also equals to RPM}_{\text{output shaft}}$$

3). Find the reduction ratio based on the 1750 rpm motor input and output shaft rpm:

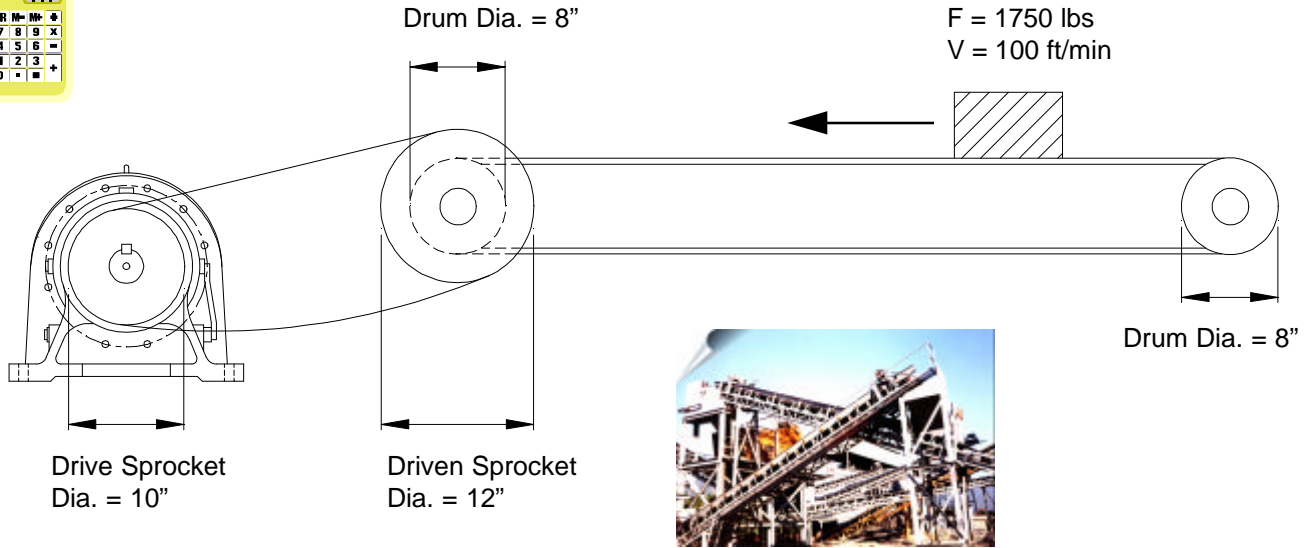
$$\text{Ratio} = \text{RPM}_{\text{motor}} / \text{RPM}_{\text{output shaft}} = 1750 \text{ rpm} / 57.32 \text{ rpm} = 30.53, \text{ chose } \mathbf{29:1}$$

Based on the calculated torque and output rpm requirement, we are now ready to determine the input hp of DARALI®DRIVE:

$$\text{Torque}_{\text{output shaft}} = (63025 \times \text{hp} \times \text{effic.}) / \text{RPM}_{\text{output shaft}} = (63025 \times \text{hp} \times 0.93) / 57.32 \text{ rpm} = 5833 \text{ inch-lbs}$$

$$\text{Solve for hp} = \mathbf{5.70}$$

Sizing Example



... continue.

Based on a 10 hours per day operation with moderate shock load, the service factor required is 1.2

$$HP_{design} = HP_{calculated} \times S.F. = 5.70 \times 1.2 = 6.84 \text{ hp (you would select a 7.5 hp motor).}$$

Go to TORQUE RATING table and look under the torque rating table of 29:1. Find the first frame size with the input horsepower that exceeds 6.84 hp. You should find B13 with input hp rating of 7.09, and output torque capability of 6860 in-lbs.

Since the output shaft of DARALI®DRIVE in this application is connected to a sprocket, you must consider the overhung load capability. Please refer to OVERHUNG LOAD.

Assume:

Connection Type = Chain ($F_c = 1$),
Moderate Shock Load ($F_s = 1.2$)

Load Position = Middle of Output Shaft ($F_l = 1$)

$$\begin{aligned} OHL &= (126,000 \times hp \times F_l \times F_c \times F_s) / (\text{Diam}_{pitch} \times \text{rpm}) \\ &= (126,000 \times 5.70 \times 1 \times 1 \times 1.2) / (10 \text{ inch} \times 57.32 \text{ rpm}) \\ &= 1504 \text{ lbs} \end{aligned}$$

Use this calculated OHL, and compare it to the permissible output shaft overhung load on page 42 with output rpm=57.32, you will find that 1504 lbs < 2270 lbs (rpm = 50) and 1504 lbs < 2140 lbs (rpm = 60). Your selection is OK, and you are now ready to construct the part number.

FRAME SIZE = **B13**

RATIO = 29 (**29:1**)

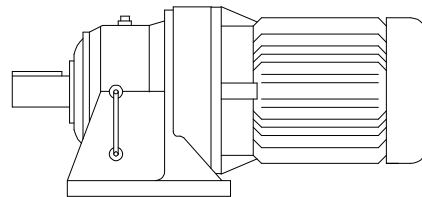
INPUT = Integral Gearmotor 7.5 hp (**8M**)

MOUNTING = Foot Mount (**H**)

OUTPUT DIRECTION = Horizontal (**H**)



PART NUMBER:
B13-29:1-8MHH



Call factory or your nearest Authorized
DARALI® Distributor for Price & Availability