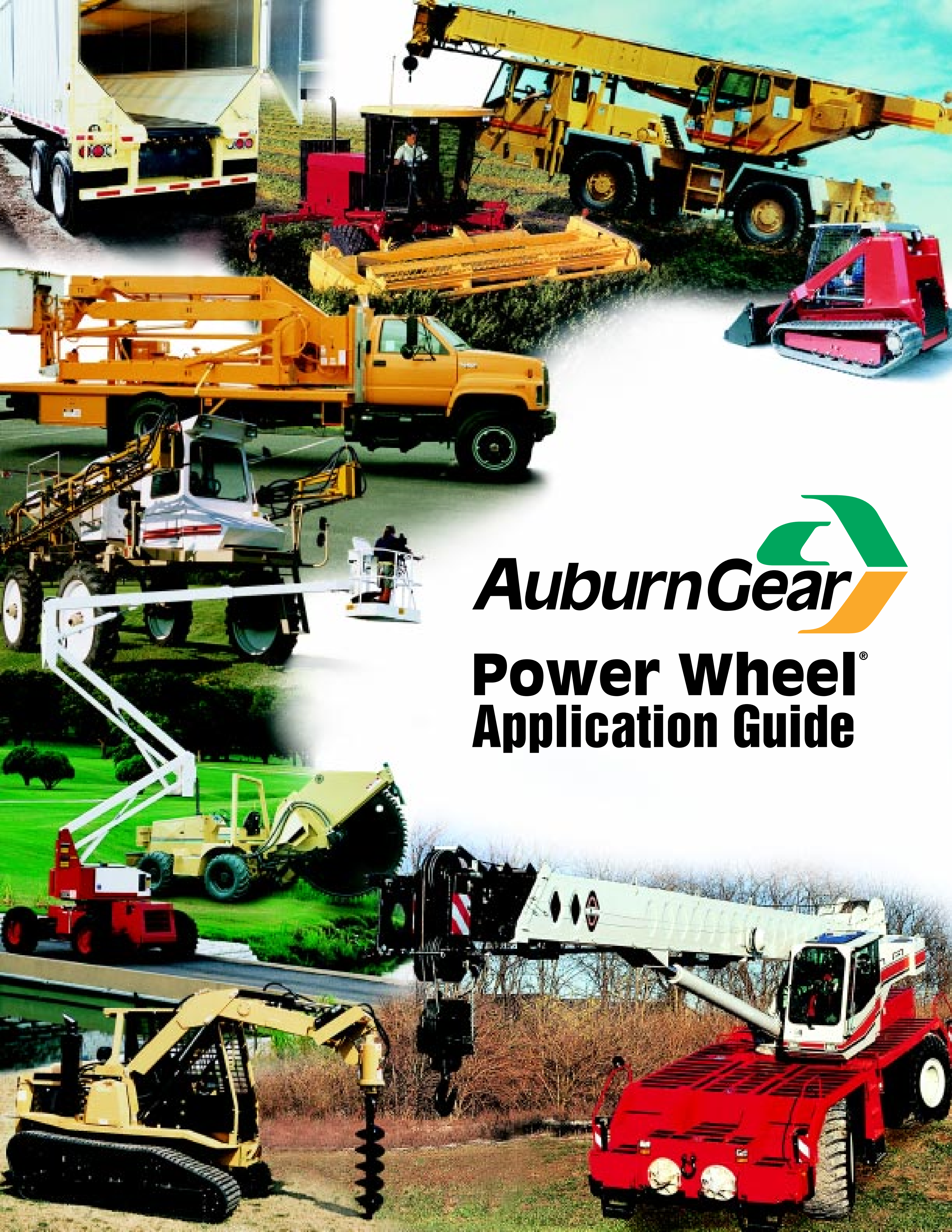


Auburn Gear

# Power Wheel®
## Application Guide

## CONTENTS



# AuburnGear Power Wheel® Final Drives

## INTRODUCTION

Auburn Gear is your reliable source for a variety of power transfer products. This application guide highlights the **Power Wheel®** Planetary Gear Drive product offering.

We also offer planetary gear kits and limited-slip differentials. We offer you services for design, engineering, prototype support and full testing and production capabilities. Product applications include aerial lift, agricultural, automotive, construction, forestry, industrial and marine. Auburn Gear offers you quality and reliability backed by more than 50 years of experience.

### Greater Design Flexibility

Power Wheel® planetary drives allow greater flexibility than conventional power train systems and often eliminate the need for components such as drive shafts, axles and chain drives. The many models and styles offered meet a wide range of mobile and industrial application requirements. Single and double reduction ratios can be furnished. In addition, they can be supplied with a variety of motor mounts and inputs which allow them to be used with most makes of hydraulic motors.

### High Efficiency and Compact Design

Providing 96 to 98% power transfer efficiency, Power Wheel® planetary drives are significantly more efficient than many other types of drives, including differential design planetaries. The rugged, compact design of these drives saves space and provides for long service life.

All models can be furnished with parking brakes. Auburn Gear has designed integral A2 Series parking brakes in Models 5, 6, 6B, 7, 8 , 8B and 9. These units provide a very compact planetary drive/parking brake package which is particularly useful in applications where space is limited.

### Responsive Performance

Power Wheel® drives deliver the power you require for smooth operation and precise control. These units are also fully reversible. Reverse power is easily obtained by reversing rotation of the input. For vehicle applications, the positive traction provided by individually powered wheels results in superior maneuverability and improved ground clearance over conventional drive systems.

Auburn Gear Power Wheel drives can be an efficient solution for any application where you need to increase torque or reduce speed to achieve usable power. Let Power Wheel® planetary drives help you put power in its place.

# GEAR AND BEARING RATING DEFINITIONS

**INTERMITTENT OUTPUT TORQUE RATING** - A conservative value at which the Power Wheel® would be expected to ultimately fail should it be operated at this level continuously.

**CONTINUOUS OUTPUT TORQUE RATING** - A torque value between 33% and 50% of the maximum intermittent value can usually be considered safe and should yield acceptable life.

## SPEED RATING

Auburn Gear Power Wheel maximum input speed ratings are defined as follows, regardless of model:

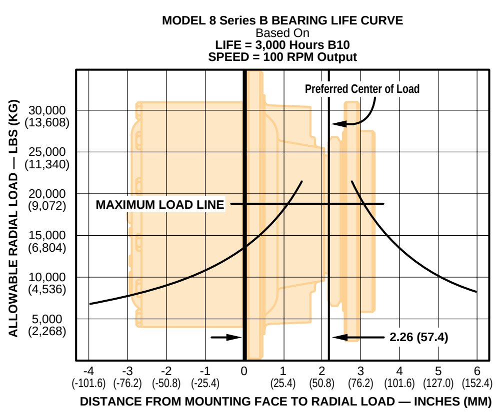
| UNIT | RPM |
|---|---|
| A2 Series Integral Brake Unit | 2,000* |
| Single Reduction Unit without brake | 3,500 |
| Double Reduction Unit without brake | 5,000 |

* For speeds between 2,000 and 3,600 RPM contact Auburn Gear for duty cycle analysis.

The speed rating has been defined based upon the thermal capacity of the gear box. If your application requires parameters greater than the above defined limits, please contact Auburn Gear with your duty cycle details.

## BEARING RATING

Auburn Gear Power Wheel radial bearing load capacity is based on a B10 life of 3,000 hours at an output speed of 100RPM. For example, a Model 8 Series B Wheel Drive SAE B configuration 8W2B, the bearing life is limited by the output speed as well as the load center.




| LOAD CENTER (in) | MAX. RADIAL LOAD (lbf) |
|---|---|
| 3 | 18,800 |
| 2 | 18,800 |
| 1 | 18,000 |
| 0 | 13,000 |
| -1 | 11,000 |
| -2 | 8,500 |
| -3 | 7,500 |

In addition, if the anticipated load and output speed are known, one can theoretically develop the bearing life based on the chart below, i.e. anticipated load 15,000 lbs at 2” load center, output speed = 200 RPM.

**BEARING LOAD, LIFE AND SPEED RELATIONSHIPS**

$$LF = \frac{SF \times R}{R'}$$

**R** = Allowable resultant load for given location from mounting flange

**R’** = Anticipated load at location from mounting flange

**LF** = Life Factor from table *(see below)*

**SF** = Speed Factor from table *(see below)*

| OUTPUT SPEED (RPM) | SF | LF | BEARING HOURS B-10 LIFE |
|---|---|---|---|
| 5 | 2.456 | .584 | 500 |
| 10 | 1.994 | .719 | 1000 |
| 20 | 1.620 | .812 | 1500 |
| 30 | 1.435 | .886 | 2000 |
| 40 | 1.316 | .947 | 2500 |
| 50 | 1.231 | 1.000 | 3000 |
| | | ➡ | 3051 |
| 60 | 1.165 | 1.047 | 3500 |
| 70 | 1.113 | 1.090 | 4000 |
| 80 | 1.069 | 1.130 | 4500 |
| 90 | 1.032 | 1.166 | 5000 |
| 100 | 1.000 | 1.231 | 6000 |
| ➡ 200 | .812 | 1.289 | 7000 |
| 300 | .719 | 1.342 | 8000 |
| 400 | .659 | 1.390 | 9000 |
| 500 | .617 | 1.435 | 10000 |

**CAUTION:** The same torsional loading constraints used in the driving mode must be used in the braking mode when braking through the **Power Wheel** drive gear set.

Life Factor = (.812x18,800)/15,000=1.017, therefore one could expect 3,051 hours of theoretical bearing life based on the paramaeters given.

# Power Wheel® PRODUCT SUMMARY

## WHEEL DRIVES

| Model | Reduction | Maximum Intermittent Output Torque* (lb-in) | Nominal Ratio Range | A2 Series Integral Parking Brake Option | Bolt-on Parking Brake Option |
|---|---|---|---|---|---|
| **6W** | Single | 22,000 | 3 – 5:1 | ✔ | |
| **6WB[1]** | Single | 22,000 | 3 – 5:1 | ✔ | |
| **6W** | Double | 50,000 | 13 – 33:1 | ✔ | |
| **6WB[1]** | Double | 50,000 | 13 – 33:1 | ✔ | |
| **6W2** | Double | 50,000 | 13 – 33:1 | ✔ | |
| **7W** | Double | 70,000 | 13 – 33:1 | ✔ | |
| **8W** | Double | 100,000 | 14 – 49:1 | ✔ | |
| **8W2** | Double | 100,000 | 14 – 49:1 | ✔ | |
| **9W** | Double | 130,000 | 14 – 49:1 | ✔ | |
| **10W** | Double | 180,000 | 16 – 51:1 | | ✔ |

[1] Brgless Motor (Char-Lynn® 2000 or DanfossOMSS)

## SHAFT DRIVES

| Model | Reduction | Maximum Intermittent Output Torque* (lb-in) | Nominal Ratio Range | A2 Series Integral Parking Brake Option | Bolt-on Parking Brake Option |
|---|---|---|---|---|---|
| **5T** | Single | 22,000 | 3 – 6:1 | ✔ | |
| **6F** | Single | 30,000 | 3 – 6:1 | ✔ | |
| **6HCF** | Single | 30,000 | 5:1 | | |
| **6HFF** | Single | 30,000 | 5:1 | | |
| **6R** | Single | 30,000 | 3 – 6:1 | ✔ | |
| **6T** | Single | 30,000 | 3 – 6:1 | ✔ | |
| **6S** | Double | 50,000 | 14 – 34:1 | ✔ | |
| **6S2** | Double | 50,000 | 14 – 34:1 | ✔ | |
| **7S** | Double | 70,000 | 14 – 34:1 | ✔ | |
| **8HCF** | Single | 60,000 | 4 – 6:1 | | |
| **8HFF** | Single | 60,000 | 4 – 6:1 | | |
| **8T** | Single | 60,000 | 3 – 7:1 | ✔ | |
| **8HCF** | Double | 100,000 | 23 – 32:1 | | |
| **8HFF** | Double | 100,000 | 23 – 32:1 | | |
| **8S** | Double | 100,000 | 15 – 50:1 | ✔ | |
| **8S2** | Double | 100,000 | 15 – 50:1 | ✔ | |
| **9S** | Double | 130,000 | 15 – 50:1 | ✔ | |
| **10S** | Double | 180,000 | 17 – 52:1 | | ✔ |

## SPINDLE DRIVES

| Model | Reduction | Maximum Intermittent Output Torque* (lb-in) | Nominal Ratio Range | A2 Series Integral Parking Brake Option | Bolt-on Parking Brake Option |
|---|---|---|---|---|---|
| **5TF** | Single | 22,000 | 3 – 6:1 | ✔ | |
| **6FF** | Single | 30,000 | 3 – 6:1 | ✔ | |
| **6HCF** | Single | 30,000 | 5:1 | | |
| **6TF** | Single | 30,000 | 3 – 6:1 | ✔ | |
| **6SF** | Double | 50,000 | 14 – 34:1 | ✔ | |
| **6S2F** | Double | 50,000 | 14 – 34:1 | ✔ | |
| **7SF** | Double | 70,000 | 14 – 34:1 | ✔ | |
| **8TF** | Single | 60,000 | 3 – 7:1 | ✔ | |
| **8SF** | Double | 100,000 | 15 – 50:1 | ✔ | |
| **8S2F** | Double | 100,000 | 15 – 50:1 | ✔ | |
| **9SF** | Double | 130,000 | 15 – 50:1 | ✔ | |
| **10SF** | Double | 180,000 | 17 – 52:1 | | ✔ |

* Depending on the duty cycle and the nature of the application, a normal continuous output torque of ⅓ to ½ of the maximum intermittent should yield satisfactory Power Wheel life. Customer testing and application approval is strongly recommended.
Torque Ratings are shown in lb-in; to convert to Nm, multiply by .113.

# Power Wheel® PRODUCT SUMMARY

## SWING DRIVES

| Model | Reduction | Maximum Intermittent Output Torque* (lb-in) | Nominal Ratio Range | A2 Series Integral Parking Brake Option | Bolt-on Parking Brake Option |
|---|---|---|---|---|---|
| **6SW** | Single | 30,000 | 3 – 6:1 | ✔ | |
| **6SW** | Double | 50,000 | 14 – 34:1 | ✔ | |
| **7SW** | Double | 70,000 | 13 – 34:1 | ✔ | |
| **8SW** | Double | 100,000 | 15 – 50:1 | ✔ | |
| **9SW** | Double | 130,000 | 15 – 50:1 | ✔ | |
| **10SW** | Double | 180,000 | 17 – 52:1 | | ✔ |

## KITS

| Model | Reduction | Maximum Intermittent Output Torque* (lb-in) | Nominal Ratio Range | A2 Series Integral Parking Brake Option | Bolt-on Parking Brake Option |
|---|---|---|---|---|---|
| **5** | Single | 22,000 | 3 – 6:1 | ✔ | |
| **6** | Single | 30,000 | 3 – 6:1 | ✔ | |
| **6** | Double | 50,000 | 13 – 34:1 | ✔ | |
| **7** | Double | 70,000 | 13 – 34:1 | ✔ | |
| **8** | Single | 60,000 | 3 – 7:1 | ✔ | |
| **8** | Double | 100,000 | 14 – 50:1 | ✔ | |
| **9** | Double | 130,000 | 14 – 50:1 | ✔ | |
| **10** | Double | 180,000 | 16 – 52:1 | | ✔ |

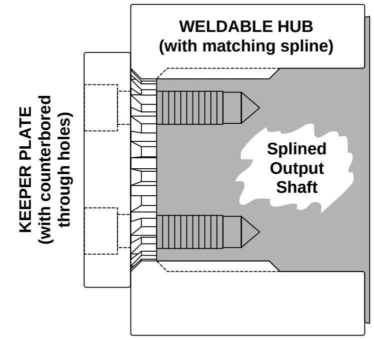
## NON-POWERED UNITS

| Model | Maximum Radial Load (lb) | Maximum Radial Load (kg) |
|---|---|---|
| **6N** | 10,000 | 4,500 |
| **8N** | 16,000 | 7,700 |
| **82N** | 18,800 | 8,500 |
| **10N** | 30,000 | 13,600 |

* Depending on the duty cycle and the nature of the application, a normal continuous output torque of $1/3$ to $1/2$ of the maximum intermittent should yield satisfactory Power Wheel life. Customer testing and application approval is strongly recommended.
Torque Ratings are shown in lb-in; to convert to Nm, multiply by .113.

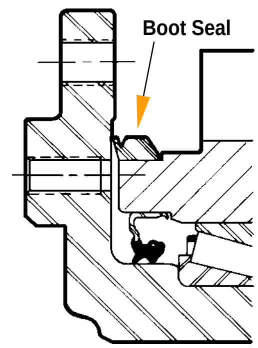
# OTHER **Power Wheel®** OPTIONS

## Weldable Hub



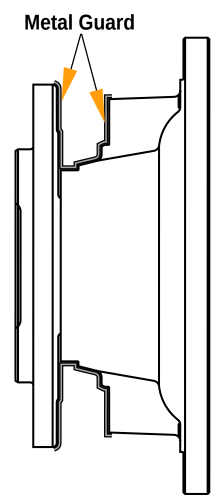

The hubs are 4140H steel and can be turned down and/or welded for mounting sprockets, pulleys, or other devices. A circular keeper plate secures the hub to the splined output shaft with two bolts (keeper plate and bolts included).

| KIT NUMBER | SPLINE | FITS MODELS |
|---|---|---|
| 6420105 | 23T–12/24 | 5, 6, & 8 |
| 6420106 | 23T–8/16 | 6B, 7, 8, 8B, 9, & 10 |
| 6420107 | 20T–8/16 | 8, 8B, & 9 |




## Boot Seal

An optional seal that protects the main oil seal from dirt and other debris. The boot seal will give extended life on applications operating in extremely muddy or dirty conditions. Boot seals are available on a selective model basis.

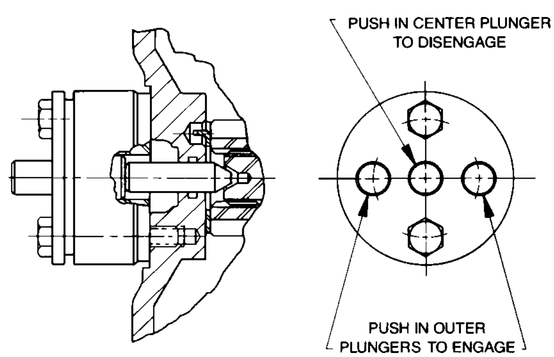



## Guard and Boot Seal System

A boot seal and metal guard are available in the Model 6, 9 and 10 spindle output units only. These can be ordered separately or together. They function best together. The guard and boot seal system are utilized in extremely high grit applications. The guard protects the boot seal from contaminants which will ultimately wear the boot seal lip.

## Quick Disconnect

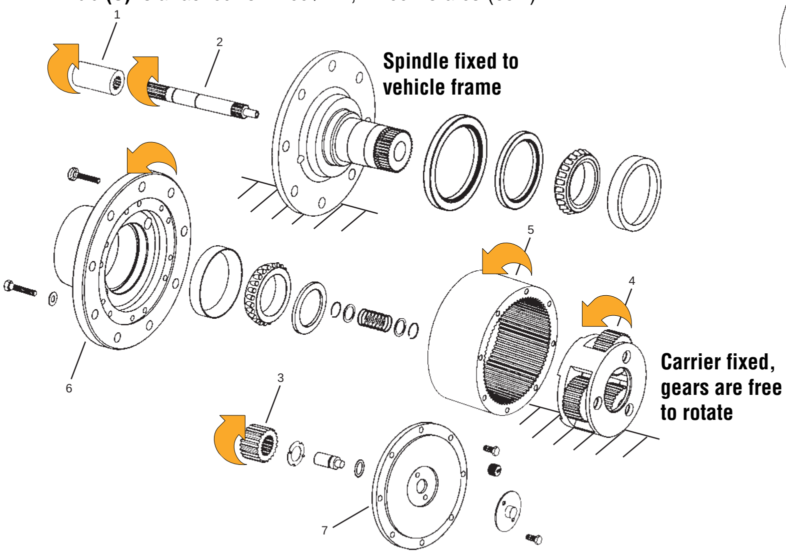
This optional disconnect is available on all wheel drives. No tools are needed to disengage or re-engage the drive. The planetary drive is disengaged with the push of a button. The quick disconnect eliminates removal of the disconnect cover and external contaminates are sealed from the units by internal o-rings and a gasket that is sandwiched between the disconnect and planetary cover. The rugged, compact design ensures dependable service.



# POWER FLOW

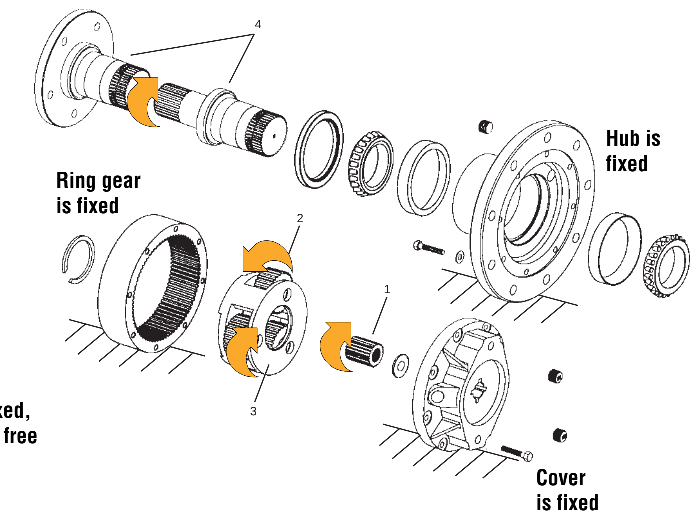
## Wheel Drive, Single Reduction

1. Coupling **(1)** rotates in the direction of motor shaft rotation(cw)
2. Input shaft **(2)** splined to coupling (cw)
3. Sun gear **(3)** splined to input shaft (cw)
4. Planet gears **(4)** rotate opposite sun gear (ccw)
5. Planet gears **(4)** drive ring gear **(5)** in same direction (ccw)
6. Ring gear **(5)** is attached to the hub **(6)**, hub rotates (ccw)
7. Hub **(6)** is attached to wheel/rim, wheel rotates (ccw)



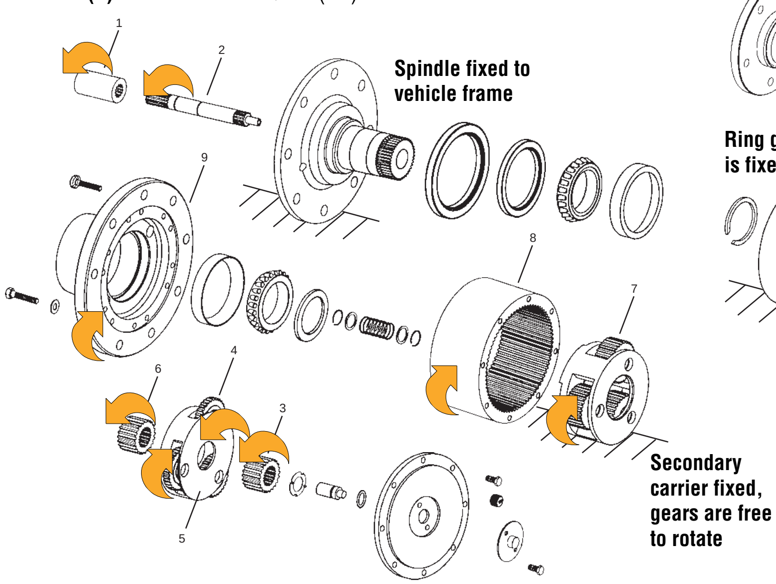

## Shaft/Spindle Output, Single Reduction

1. Sun gear **(1)** rotates in the direction of motor shaft rotation (cw)
2. Planet gears **(2)** rotate opposite sun gear **(1)** (ccw)
3. Carrier **(3)** is driven in the same direction as the sun gear **(1)** (cw)
4. Spindle or shaft **(4)** is splined to carrier **(3)**, therefore it rotates (cw)



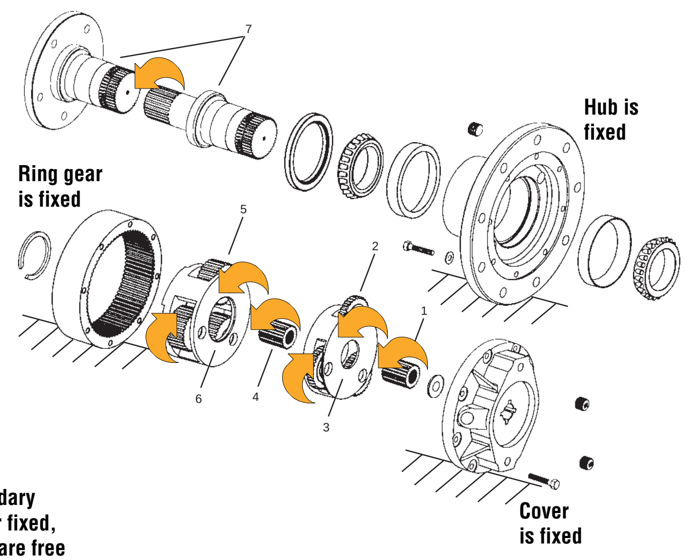

## Wheel Drive, Double Reduction

1. Coupling **(1)** rotates in the direction of motor shaft rotation (ccw)
2. Input shaft **(2)** splined to coupling (ccw)
3. Primary sun gear **(3)** splined to input shaft (ccw)
4. Planet gears **(4)** rotate opposite sun gear (cw)
5. Primary carrier **(5)** rotates opposite planet gears (ccw)
6. Secondary sun gear **(6)** attached to primary carrier **(5)** (ccw)
7. Secondary planet gears **(7)** rotate opposite sec. sun gear **(6)** (cw)
8. Ring gear **(8)** rotates same direction as sec. planet gears **(7)** (cw)
9. Hence driving the hub **(9)** (cw)
10. Hub **(9)** attached to wheel/rim (cw)




## Shaft/Spindle Output, Double Reduction

1. Primary sun gear **(1)** rotates in the direction of motor shaft rotation (ccw)
2. Primary planet gears **(2)** rotate (cw)
3. Primary carrier **(3)** driven (ccw)
4. Secondary sun gear **(4)** attached to primary carrier **(3)** (ccw)
5. Secondary planets **(5)** rotate opposite secondary sun gear **(4)** (cw)
6. Secondary carrier **(6)** driven (ccw)
7. Output spindle or shaft **(7)** splined to secondary carrier assembly **(6)** (ccw)




In summary:

- Wheel drives, the direction of input rotation is opposite of output rotation
- Shaft/spindle output and swing drives, the direction of input rotation is the same as the output

# Power Wheel® APPLICATION DATA

A typical application adapts the Power Wheel to a hydrostatically-driven vehicle; however, the basic formulas apply to other uses as well. The following formulas calculate gradeability torque only.

For mobile equipment, identify parameters for the vehicle and its desired performance. They are listed in Table 1.

Determine the road rolling resistance (rr) in pounds per 1,000 lbs. (kg. per 1,000 kg) of gross vehicle weight and the percent grade equivalent (RR%) from Table 2. Calculate the road rolling resistance (RR) in pounds (kg):

① $$\mathbf{RR = \frac{GVW \times rr}{1000}}$$

$$RR\ (kg) = \frac{GVW\ (kg) \times rr\ (kg)}{1000}$$

Calculate the Power Wheel input speed necessary to obtain the desired maximum vehicle ground speed:

② $$\mathbf{Ni = \frac{168 \times V \times Ra}{r}}$$

$$Ni = \frac{2652 \times V\ (km/hr) \times Ra}{r\ (mm)}$$

This value should not exceed the speed parameters specified on page 3. The Power Wheel ratio (Ra) may be used to adjust the input speed to the desired level while maintaining the required ground speed.

The output torque required for gradeability (G) and wheel slip can now be calculated:

③ $$\mathbf{Tog = \frac{GVW \times r \times (G + RR\%)}{100}}$$

$$Tog\ (Nm) = \frac{GVW\ (kg) \times r\ (mm) \times (G + RR\%)}{10{,}194}$$

√ $$\mathbf{Tos = VW \times m \times r}$$

$$Tos\ (Nm) = \frac{VW\ (kg) \times m \times r\ (mm)}{102}$$

Select the correct Power Wheel from the general specifications contained in Table 4. Consider the maximum output torque to be a conservative ultimate value at which the Power Wheel would be expected to fail should it be operated at this level continuously. Intermittent torque peaks of short duration at this level should not damage the Power Wheel. A torque value of between 33% and 50% of the maximum intermittent value can usually be considered safe for continuous operation.

The net force available to drive the vehicle, termed the "drawbar pull," is the difference between the tractive effort (Tos / r) produced by the Power Wheel output torque and the road pulling resistance:

⑤ $$\mathbf{DPos = \frac{Tos}{r} - RR}$$

$$DPos\ (kg) = \frac{1000 \times Tos\ (kgm)}{r\ (mm)} - RR\ (kg)$$

After selecting the appropriate Power Wheel, verify that the unit will provide satisfactory bearing life and still support the anticipated radial load. Refer to the appropriate bearing load curve, and read the allowable radial load (R) at the appropriate distance of the load centerline from the wheel mounting face. This value, the anticipated load at the location from the mounting flange (R') and the bearing speed factor (SF, determined from the chart adjacent to the bearing load curve), can be used to determine the life factor (LF) and the hours of B-10 bearing life expected (read the B-10 hours from the chart adjacent to the bearing load curve). The bearing capacity of each Power Wheel is matched to that unit's torque capacity so the same Power Wheel will provide both adequate torque and bearing life for a specific range of vehicle sizes and weights.

The above information is provided as a guide in applying the Power Wheel. The application data worksheet in this brochure may be used to supply information to Auburn Gear for specific application recommendations.

**A typical Power Wheel application:**

Self propelled windrower
Two front wheels driving
Weight distribution 60% front, 40% rear
Gross vehicle weight, 6,000 lbs. (2,721 kg)
Weight on driving tires, 3,600 lbs. (1 ,633 kg)
Rolling radius of driving tires, 16" (406.4 mm)
Maximum percent gradeability desired, 25%
Maximum vehicle ground speed desired, 10 mph (16.21 km/hr)
Coefficient of friction 0.6
Operation on smooth dirt
Power Wheel ratio — 24.5:1

From Table 2:

rr = 25 lbs. (kg) per 1,000 lb. (kg) gross vehicle weight; RR% = 2.5%

Calculate the road rolling resistance (RR) from equation:

$$\mathbf{RR = \frac{(6{,}000)\ (25)}{1000} = 150\ lbs.}$$

$$RR = \frac{(2721)\ (25)}{1000} = 68.03\ kg$$

Calculate the Power Wheel input speed necessary to obtain the desired maximum vehicle ground speed:

$$Ni = \frac{(168)\ (10)\ (24.5)}{16} = 2572.5\ rpm$$

$$\mathbf{Ni = \frac{(2652)\ (16.09)\ (24.5)}{406.4} = 2572.5\ rpm}$$

From equation ③, calculate the Power Wheel ouput torque required to obtain the desired gradeability:

$$\mathbf{{}^*Tog = \frac{(6{,}000)\ (16)\ (25 + 2.5)}{100} = 26{,}400\ lb.\ in.}$$
(13,200 lb.in./wheel)

$$^*Tog = \frac{(2{,}721)\ (406.4)\ (25 + 2.5)}{10{,}194} = 2{,}983\ Nm$$
(1,491.5 Nm/wheel)

Calculate the Power Wheel output torque required to obtain wheel slip from equation √ :

$$\mathbf{{}^*Tos = (3{,}600)\ (0.6)\ (16) = 34.560\ lb.\ in.}$$
(17,280 lb.in./wheel)

$$^*Tos = \frac{(1{,}633)\ (0.6)\ (406.4)}{102} = 3{,}904\ Nm$$
(1,952 Nm/wheel)

From the calculations the Model 6 Power Wheel would be most suitable for this application in terms of torque capacity, and the maximum input speed of 2572.5 rpm is well within the speed limitation of the Power Wheel.

Determine the drawbar pull from equation ⑤:

$$\mathbf{DPos = \frac{34{,}560}{16} - 150 = 2010\ lbs.}$$

$$DPos = \frac{(1{,}000)\ (398.1)}{406.4} - 68.03 = 911.5\ kg.$$

The gross force available to drive the vehicle, termed the tractive effort, is 2160 lbs. (34,560/16) or 979.6 kg (398,100/406.4)

Now that the Model 6 ratio 24.5:1 has been determined as the most suitable unit, determine the B-10 bearing life to confirm the application. Assuming the centerline of 1800 lbs. (816.3 kg) load (R') is located .5" (12.7 mm) away from the spindle mounting flange, the allowable resultant radial load for 3000 hours B-10 at 100 rpm (R) is 5000 lbs. (2267 kg). For an output speed of 105 rpm (Ni = 2572.5/ 24.5), the speed factor (SF) is approximately 1.00. Now the life factor (LF) can be calculated:

$$\mathbf{LF = \frac{5000}{1800} \times 1.00 = 2.78}$$

$$LF = \frac{2267}{816.3} \times 1.00 = 2.78$$

which will give a B-10 life in excess of 10,000 hours and confirms that the Model 6 is the most appropriate Power Wheel for this application.

* These values are vehicle torque requirements. To obtain required torque per Power Wheel, divide by the number of wheels driving the vehicle.

# TABLES AND GLOSSARY

## TABLE 1

### KNOWN VALUES FROM VEHICLE AND PERFORMANCE PARAMETERS

| | |
|---|---|
| GVW | Gross vehicle weight (lbs.) (kg) |
| VW | Weight on driving tires (lbs.) (kg) |
| r | Rolling radius (static, loaded) of driving tires (in.) (mm) |
| G | Percent gradeability (maximum desired) |
| V | Vehicle speed (maximum desired, mph) (km/hr) |
| m | Coefficient of friction |

## TABLE 3

### VALUES TO BE CALCULATED

| | |
|---|---|
| RR | Road Rolling Resistance (lbs.)(kg.) |
| Ni | Input speed to Power Wheel (rpm) |
| Tog | Power Wheel output torque required to obtain desired gradeability (lb. in.) (Nm) |
| Tos | Power Wheel output torque required to obtain wheel slip (lb. in.) (Nm) |
| DPos | Drawbar pull available at wheel slip (lbs ) (kg) |

## TABLE 2

### ROAD ROLLING RESISTANCE (rr) AND % GRADE EQUIVALENTS (RR%)

| | **SURFACE** | **rr** Pounds (kg) per 1,000 lb. (kg) GvW | | **RR%** Equivalent % Grade |
|---|---|---|---|---|
| **1.** | Concrete, Excellent | 10 | (10) | 1 |
| **2.** | Concrete, Good | 15 | (15) | 1.5 |
| **3.** | Concrete, Poor | 20 | (20) | 2 |
| **4.** | Asphalt, Good | 12 | (12) | 1.2 |
| **5.** | Asphalt, Fair | 17 | (17) | 1.7 |
| **6.** | Asphalt, Poor | 22 | (22) | 2.2 |
| **7.** | Macadam, Good | 15 | (15) | 1.5 |
| **8.** | Macadam, Fair | 22 | (22) | 2.2 |
| **9.** | Macadam, Poor | 37 | (37) | 3.7 |
| **10.** | Cobbles, Ordinary | 55 | (55) | 5.5 |
| **11.** | Cobbles. Poor | 85 | (85) | 8.5 |
| **12.** | Snow, Two Inch | 25 | (25) | 2.5 |
| **13.** | Snow, FourInch | 37 | (37) | 3.7 |
| **14.** | Dirt, Smooth | 25 | (25) | 2.5 |
| **15.** | Dirt, Sandy | 37 | (37) | 3.7 |
| **16.** | Mud | 37–150 | (37–150) | 3.7–15.0 |
| **17.** | Sand, Level & Soft | 60–150 | (60–150) | 6.0–15 0 |
| **18.** | Sand, Dune | 160–300 | (160–300) | 16.0–30.0 |

## TABLE 4

### POWER WHEEL GENERAL SPECIFICATIONS

Ra Ratio: See catalog pages for ratios available.

Nimax: Maximum input speed to Power Wheel:
All Double Reduction Models - 5000 RPM
All Single Reduction Models - 3500 RPM
All Integral A2 Series Brake Models - 2000 RPM

TM* Maximum intermittent output torque ratings:
Reference pages 4 and 5

*Depending on the duty cycle and the nature of the application a normal continuous output torque of ⅓ to ½ of the maximum intermittent should yield satisfactory Power Wheel life. Customer testing and application approval is strongly recommended.

# WORKSHEET

**GENERAL**

CUSTOMER ______________________ DATE __________

APPLICATION ______________________

MODEL OR TYPE ______________________

DESIGN LIFE REQUIRED (L10) ______________________

**WHEEL DRIVE DATA**

GVW ______________ NO. OF DRIVING WHEELS __________

% OF WEIGHT OVER DRIVE WHEELS __________ FRONT __________ REAR

% GRADEABILITY REQUIRED __________ MAXIMUM __________ AVERAGE

SPEED REQUIREMENTS ______ MAXIMUM ______ WORKING ______ GRADE

TIRE SIZE ______________ FRONT __________ REAR

ROLLING RADIUS ______________ FRONT __________ REAR

RIM OFFSET ______________ FRONT __________ REAR

ROAD CONDITIONS ______________________

DUTY CYCLE INFORMATION:

COND #1 ________ % @ ________ % GRADE @ ________ MPH @ ________ Radial Load (lb)

COND #2 ________ % @ ________ % GRADE @ ________ MPH @ ________ Radial Load (lb)

COND #3 ________ % @ ________ % GRADE @ ________ MPH @ ________ Radial Load (lb)

COND #4 ________ % @ ________ % GRADE @ ________ MPH @ ________ Radial Load (lb)

**SHAFT, SPINDLE OR SWING DRIVE DATA**

MAXIMUM TORQUE REQUIRED ______________ CONTINUOUS __________

MAX. SPEED REQUIRED ______________ CONTINUOUS __________

MAX. OVERHUNG LOAD ______________

DISTANCE MTG. FLANGE TO OVERHUNG LOAD ______________

SPROCKET OR PINION DATA:

PITCH DIA. ______________ GEAR PITCH ______________

PRESSURE ANGLE ______________ NO. OF TEETH __________

DUTY CYCLE INFORMATION:

COND #1 ________ % @ ________ LB. IN. @ ________ RPM @ ________ Average Load (lb)

COND #2 ________ % @ ________ LB. IN. @ ________ RPM @ ________ Average Load (lb)

COND #3 ________ % @ ________ LB. IN. @ ________ RPM @ ________ Average Load (lb)

COND #4 ________ % @ ________ LB. IN. @ ________ RPM @ ________ Average Load (lb)

**HYDRAULICS**

HYDRAULIC MOTOR MODEL NO. ______________ MFR. __________

TYPE OF OUTPUT SHAFT (13T – $^{16}/_{32}$, etc.) ______________

SAE MOUNTING DESIGNATION (A, B, etc.) ______ 2-BOLT ______ 4-BOLT ______

DISPLACEMENT (CU.IN./REV.) ________ RELIEF SETTINGS (PSI) __________

TORQUE ______________ LB. IN. @ __________ PSI MAXIMUM

**BRAKE DATA**

BRAKE RELEASE TYPE: CHARGE PRESSURE ________ SYSTEM PRESSURE ________

BRAKE MODEL NO. ________ MFR. (If not Auburn Gear) ______________

OTHER (NAME) ________ PRESSURE RANGE (PSI) ______________

MINIMUM PRESSURE TO BRAKE WHEN BRAKE IS APPLIED (PSI) ______________

BRAKE TORQUE ______________________

**SPECIAL OPERATING CONDITIONS**

______________________

______________________

______________________

______________________

# LUBRICATION DATA

**Power Wheel Planetary Drives are shipped without lubricant and must be filled to the proper level prior to start-up.**

1. **Type**
   In normal applications use an extreme pressure lubricant API-GL-5 approved. AGI recommends SAE 80W, 90, 80W-90 and 85W-90 grades of lube under normal climate and operating conditions. See chart below. For severe or abnormal applications with special requirements consult either Auburn Gear or a lubricant manufacturer for further assistance.
2. **Change Interval**
   Initial lubrication change after 50 hours of operation. Subsequent changes every 1000 hours or yearly whichever comes first.
3. **Lube Temperature**
   Continuous operating temperatures of 160°F are allowable. Maximum intermittent temperature recommended is 200°F.
4. **Amount of Lube**
   The unit should be half full when mounted horizontal. Lube levels for other mounts will vary. Consult Auburn Gear for details.
5. **Shaft or Spindle Up Mounting**
   If mounting unit vertically with shaft or spindle up, special provisions apply to ensure adequate lubrication of output bearings. Consult Auburn Gear.

**Auburn Gear Power Wheel Low Temperature Gear Lube Requirement**

| SAE Viscosity Grade | Auburn Gear Recommended Minimum Temperature |
|---|---|
| 75W-90 | -40°F (-40°C)* |
| 80W, 80W-90 | -15°F (-26°C)* |
| 85W, 85W-90 | 10°F (-12°C)* |
| 90 | 35°F (2°C) |

* Maximum temperature for Brookfield Viscosity[1] of 150,000 centipoise (cP)[2] per SAE J306 MAR85
[1] Brookfield Viscosity - *apparent viscosity* as determined under ASTM D 2983
[2] 150,000 cP determined to provide sufficient low temperature lube properties for Auburn Gear Power Wheels

All Power Wheels® are compatible with synthetic lubricants, as long as they meet the above specified parameters.

# WARRANTY INFORMATION

## Power Wheel® Warranty

Seller warrants to Purchaser that its Power Wheel® planetary gear products are free from defects in material and workmanship under normal use and service for a period of one year from the date the product is shown to have been placed into operation by original user or for two years from date of shipment from seller's plant, whichever shall first occur.

Seller's obligation under this warranty is expressly limited to the repair or replacement at its option, of the Power Wheel which is returned with a written claim of defect f.o.b. seller's factory, Auburn, Indiana, U.S.A., and which is determined by Seller to be defective in fact.

THIS IS THE SOLE AND ONLY WARRANTY OF SELLER AND NO OTHER WARRANTY IS APPLICABLE, EITHER EXPRESSED OR IMPLIED, IN FACT OR BY LAW, INCLUDING ANY WARRANTY AS TO MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE.

The sole and only remedy in regard to any defective Power Wheel shall be the repair or replacement thereof herein provided, and seller shall not be liable for any consequential, special, incidental, or punitive damages, losses or expenses resulting from or caused by any defects.

AUBURN GEAR, INC.
AUBURN, INDIANA, U.S.A.

AuburnGear

AuburnGear

400 East Auburn Drive
Auburn, Indiana 46706-3499 • USA
PH: (219) 925-3200
FAX: (219) 925-4725
E-mail: auburngear@mail.fwi.com
Web: http://www.auburngear.com

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