

# HILLIARD DRIVE TRAIN PRODUCTS



SOLUTIONS FOR ATV, UTV, LAWN/GARDEN AND OUTDOOR POWER EQUIPMENT



SIMPLE INTEGRATION. CUSTOM DESIGN.

# Auto-Lok™ Differential

## THE NEXT STEP IN THE EVOLUTION OF THE TRANSAXLE

The Hilliard Corporation has developed a new differential for the Lawn and Garden industry. The Auto-Lok™ Differential is used on the primary drive axle and replaces the limited slip or open differential. It is easily incorporated into existing designs.

The Hilliard Auto-Lok™ Differential offers equal power transferred to both wheels on an axle regardless of traction, allowing positive back drive through both wheels. The self-contained unit locks and unlocks automatically providing the benefits of both an open and locked differential, depending on the ground conditions. Benefits include improved traction and easier operation and steering.



### WALK BEHIND APPLICATIONS:

- SNOWTHROWERS
- TRENCHERS
- TILLERS
- ANY OTHER SELF-PROPELLED 2 WHEEL POWER EQUIPMENT

## Auto-Lok™ Differential for Walk-Behind Equipment

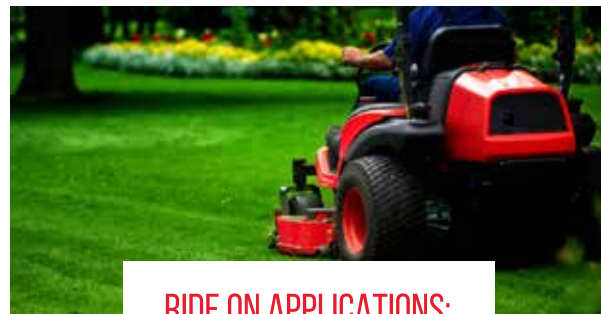
- Equal power transferred to both wheels regardless of traction
- Self-contained: No levers or mechanisms to engage or disengage
- Locks and unlocks automatically
- Improves steering and maneuverability
- Positive back drive through both wheels
- Compact design



For a video demonstration of the Hilliard Auto-Lok™ visit: [www.hilliardcorp.com/drive-train/](http://www.hilliardcorp.com/drive-train/)

## Auto-Lok™ for Primary Drive Axles

- Self-contained: No levers or mechanisms to engage or disengage
- Locks and unlocks automatically
- Positive back drive through both wheels
- No ratcheting or frictional slip during turning
- No friction plates to wear or replace
- Allows the rear outside wheel to overrun in a turn during an acceleration and the rear inner wheel to underrun during a deceleration
- Smooth, seamless engagement



### RIDE ON APPLICATIONS:

- LAWN TRACTORS
- GOLF CARTS
- UTILITY VEHICLES

## APPLICATIONS

The Hilliard Auto-Lok™ (patent 6,722,484 and 6,629,590) can be used in the following applications:

### Hydrostatic Transaxle | Conventional Transaxle | Stand-alone Differential and Axle

- Walk-behind power equipment: snowthrower, fertilizer spreader, brush cutter, commercial mower, rototiller
- Garden and lawn tractors
- Utility vehicles

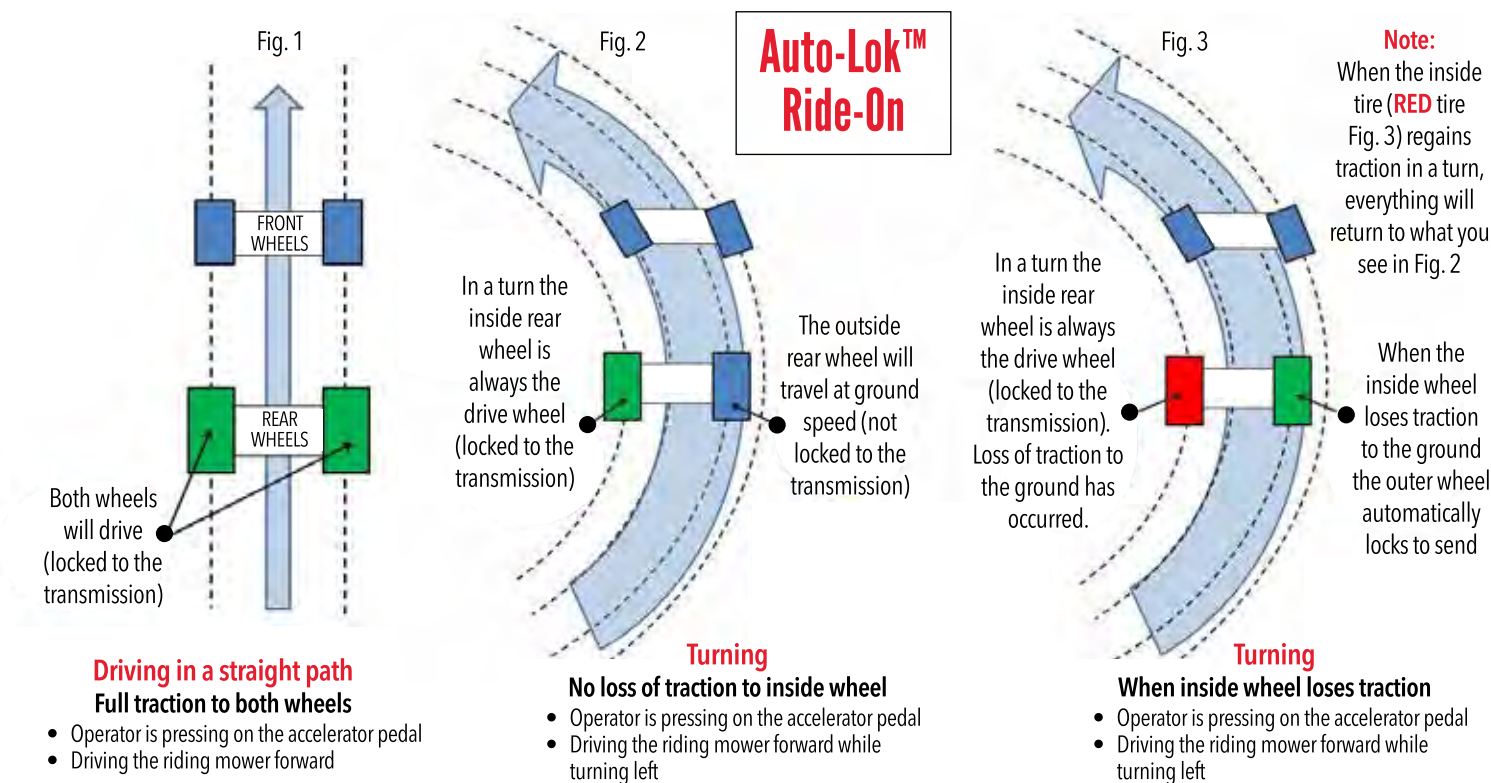
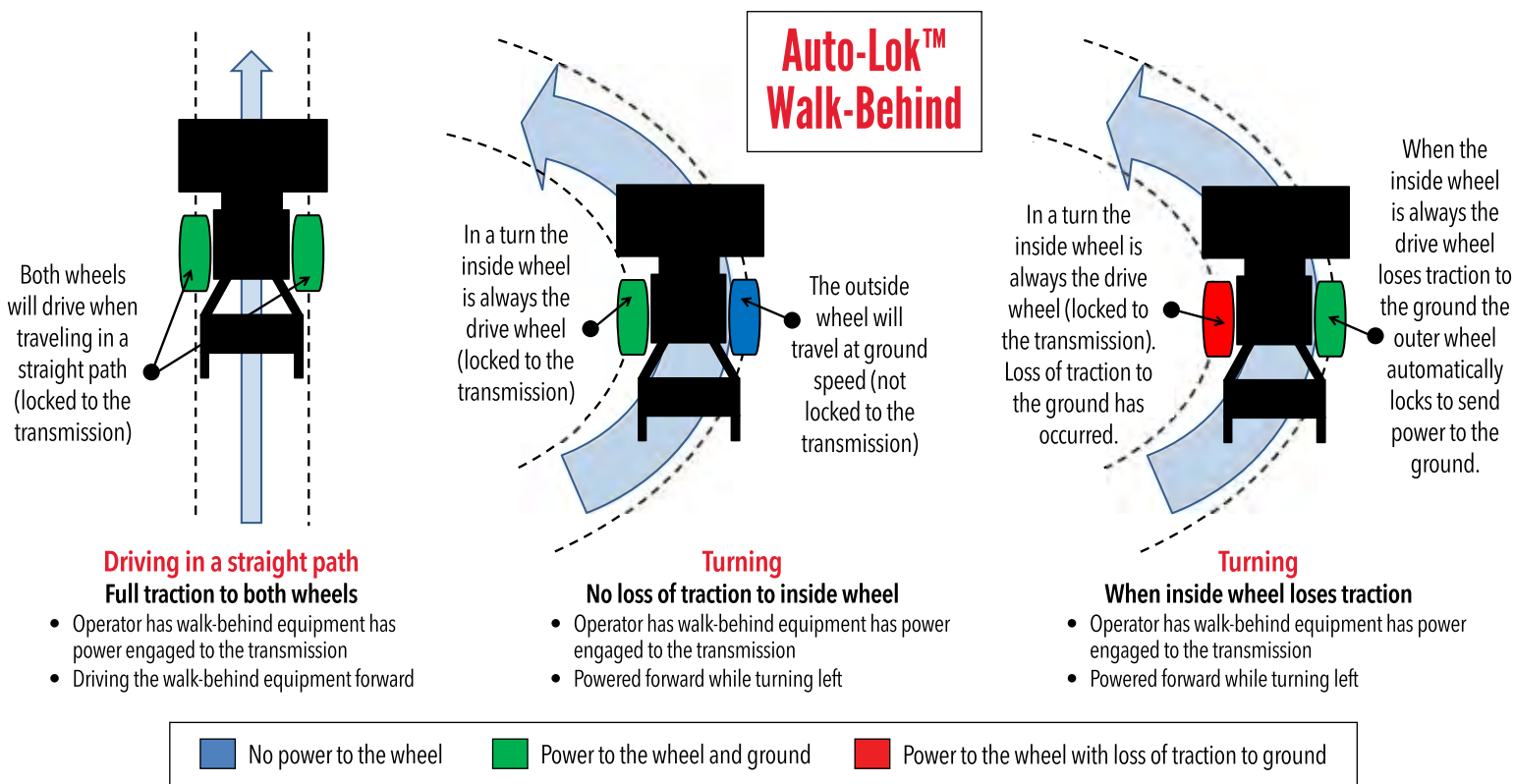




# Description of Operation

While the machine moves in a straight path in a two-wheeled application, both wheels have positive drive. When the machine turns left or right, the inner wheel will be the drive wheel and the outer wheel can move at its own speed independent of the inner wheel. When the machine is returned to a straight path, both wheels once again have positive drive.

In a four-wheeled application, when the machine turns right, the rear left wheel travels at ground speed while the rear right wheel is the drive wheel. When turning left, the rear right wheel travels at ground speed, while the rear left is the drive wheel.



When wheel's speed exceeds the speed of the clutch housing, the cage will shift the rolls to the opposite engagement angle, allowing the machine to descend down the gradient at the speed of the transmission.

# Auto Locking Front Drive System (Differential)

## FOR ON-DEMAND FOUR WHEEL DRIVE

### Basic Operation

The Hilliard Front Drive System is an electro-mechanically activated bidirectional overrunning clutch. When 12 volts of power are sent via the 4WD switch, the unit is activated to engage both front wheels instantaneously, whenever the rear wheels lose traction. The clutch also releases or overruns automatically the instant the rear wheels regain traction. Because torque is transmitted to both front wheels, it is a "true" 4WD. The overrunning characteristics of this system allow for an on-demand 4WD engagement and steering ease. Typical applications for Hilliard's front differential include ATVs and UTVs.

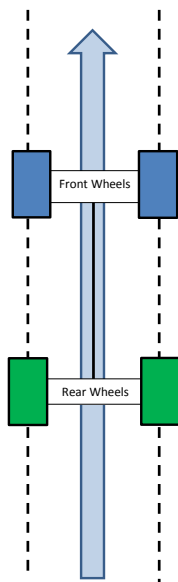


■ No power to the wheel    ■ Power to the wheel and ground    ■ Power to the wheel with loss of traction to ground

#### Front Diff 4WD – Turned ON or OFF

##### Driving in a straight path

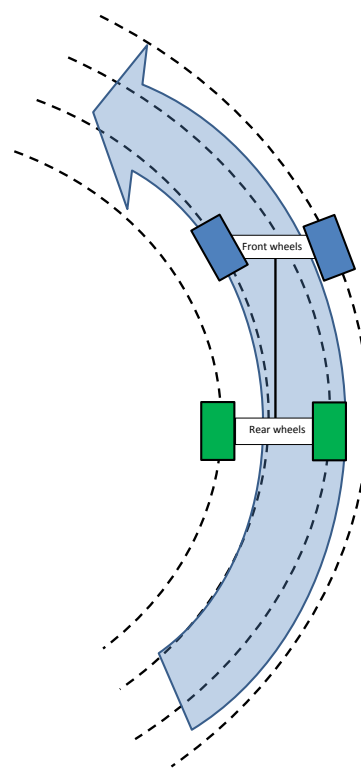
Rear Axle has traction



#### Front Diff 4WD – Turned ON or OFF

##### Turning

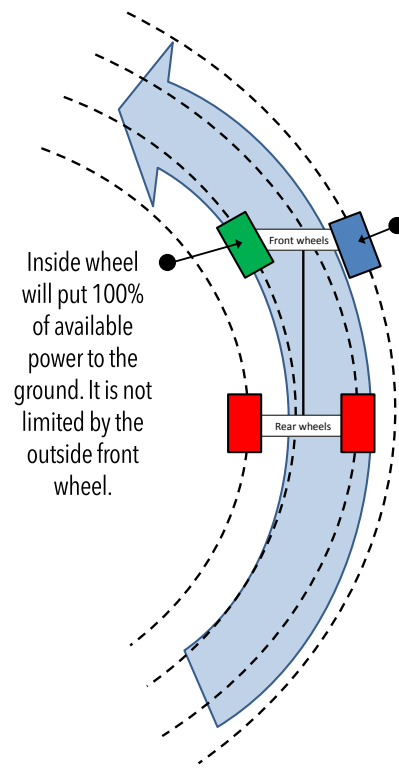
No loss of traction at rear wheels



#### Front Diff 4WD – Turned ON

##### Turning

When rear wheels lose traction



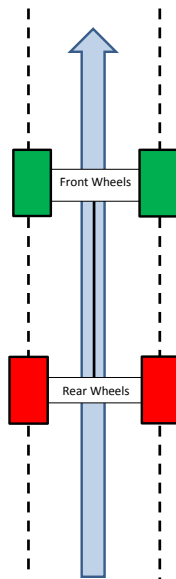
Outside wheel will overrun so torque steer is not felt and turning radius is tight. If the inside front wheel loses traction, the outside wheel automatically locks to send 100% power to the ground.

Inside wheel will put 100% of available power to the ground. It is not limited by the outside front wheel.

#### Front Diff 4WD – Turned ON

##### Driving in a straight path

Rear Axle experiences traction loss



### Features and Benefits

- Acts like a locking differential when engaged, but like an open differential when cornering
- Offers positive engagement of both front wheels in forward and reverse as a differential package
- Automatic engagement on the fly – no shift linkages required
- Electric on/off engagement (vehicle can be operated in 2WD or 4WD by the push of a button)
- Automatic disengagement
- Contact The Hilliard Corporation for available torque capacities and gear ratios





# CVT System

Hilliard offers a Continuously Variable Transmission that is more advanced than any other belt drive system currently on the market. The Hilliard clutch system utilizes a tight belt which allows for seamless engine braking and belt protection at start up and during overload situations, to extend belt life. Hilliard's CVT system is designed to fit a wide variety of clutch envelopes so no expensive modifications are required for new vehicles or on replacements for vehicles currently in the field. The Hilliard clutch system is currently tuned for many platforms, including ATV's and UTV's.



## Features and Benefits

- Unique patented centrifugal system
- Constant belt tension
- Smooth startup engagement
- Increased torque capacity at startup
- Belt protection
- Increased belt life
- Engine braking capability



# Lever Friction Drive Clutch

The Hilliard friction clutch provides smooth, quick power on demand for most start and stop applications that require positive engagement/disengagement and overload protection. The lightweight clutch mounts directly on the engine shaft and uses a cable engagement system.

## Features and Benefits

- Lightweight
- Reliable, Long Life
- Full Control of Clutch Engagement
- Can be Used with Multiple Power Sources
- Adjustable Torque Setting
- Sealed for Dusty Applications
- No Lubrication is Required



## LEVER FRICTION CLUTCH APPLICATIONS: \*

- HYDRAULIC PUMPS
- POWER TROWELS
- STATIONARY POWER UNITS
- PORTABLE SAWMILLS
- TRAILER-MOUNTED POWER EQUIPMENT
- AGRICULTURAL EQUIPMENT
- FANS AND BLOWERS
- LAWN AND GARDEN EQUIPMENT

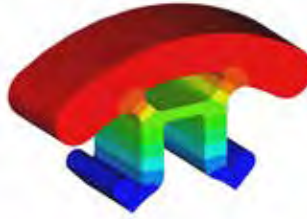
*\* For diesel applications, send engine torque curves to Hilliard to determine if the friction clutch is applicable.*





# Extreme-Duty Sprocket Centrifugal Clutch

- Sintered metal clutch shoes
- Integral key design
- Replaceable sprocket
- Bi-directional operation
- Easy-to-change springs
- Load-free starting
- Easy to install
- Patented heat dispersing spring-to-shoe design



Thermal image of clutch shoe



# Extreme-Duty Pulley Centrifugal Clutch

- Bi-directional operation
- Overload protection
- Soft starts
- Integral key design
- Sintered metal clutch shoes
- Easy to install
- Easy-to-change springs
- Optional engaging speeds
- Integral sheave
- Multiple engagement settings
- Load-free starting
- Soft starts
- Shaft sizes available in 3/4" and 1"

Horsepower range: Fractional to 12 hp

**APPLICATIONS:** CHIPPER-SHREDDERS, POWER TROWELS, AIR COMPRESSORS



The Hilliard Corporation reserves the right to change specifications and dimensions at any time. Please contact the factory for the most current information. This document contains proprietary information and such information may not be disclosed to others or used for any purpose without written permission from The Hilliard Corporation.

**ENGINEERED SOLUTIONS SINCE 1905**



**ALL HILLIARD PRODUCTS ARE DESIGNED AND MANUFACTURED IN ELMIRA, NEW YORK.**



Hilliard Products are  
Made in the USA.

## The Hilliard Corporation

100 West Fourth Street, Elmira, New York, 14902-1504 USA  
607.733.7121 | hilliardcorp.com | hilliard@hilliardcorp.com



**Hilliard**

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