



# Technical Bulletin No. 107

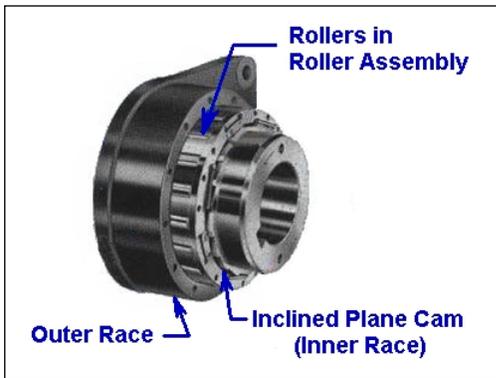
## Motorized Pulley Backstops & Brakes



### Sand and Gravel Pit (Texas—USA)

Installed in 1994 this 12.64" diameter 7.5 HP Motorized Pulley drives the 24" wide inclined "overs belt" at 300 FPM. This conveyor stacks large unusable rocks scalped from the product stream at the active face in the pit. The Motorized Pulley's built-in mechanical backstop protects personnel and equipment from product "roll back" when it is necessary to stop a fully loaded belt.

**Technical Precaution:** *The identity of each of the three phases of the power supply must be determined before attaching power supply wires to the pulley to prevent the motor from driving against the backstop. The identity of each of the three phases of the motor is clearly labeled.*



### Mechanical Backstop Exploded View

Rulmeca's mechanical backstops are built into the Motorized Pulley to limit pulley rotation to one direction (either clockwise or counterclockwise.) The backstop's keyed inner race is fixed to the motor rotor and the outer race is bolted to the motor stator frame.

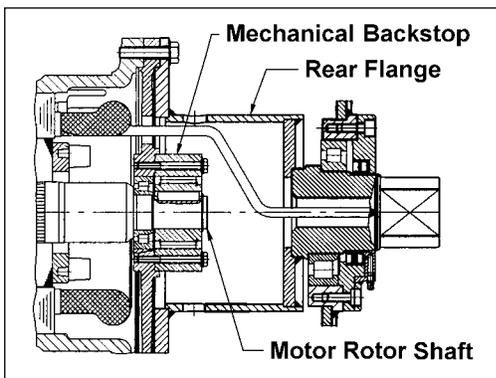
Fixing the backstop to the motor rotor shaft, on the input side of the internal gearbox, yields two advantages: (1.) the backstop has all of the mechanical advantage, which can be as high as 100:1, and (2.) it is protected in a hermetically sealed environment. On the other hand, an exposed backstop coupled to a live pulley shaft has no mechanical advantage (and must be much larger) and is exposed to the environment.



### Granite Quarry (Virginia—USA)

A 20 HP 15.75" diameter Motorized Pulley elevates crushed rock 25 feet at 384 FPM on the 30" wide fixed transfer conveyor at this plant (center of photo.) A "clockwise backstop" prevents run back of the loaded belt when power supply is off.

**Technical Precaution:** *Direction of proper pulley rotation is indicated by an aluminum arrow or plastic sticker fastened to the end housing on the terminal box (or power cord) side of the pulley. Clockwise and counterclockwise backstops are available. Pulley rotation is specified from the point of view of a person looking at the pulley from the terminal box (or power cord) side of the pulley. Rotation direction is to be specified when placing order*



### Mechanical Backstop and Rear Flange Design

Drawing shows Motorized Pulley mechanical backstop (for models 400M - 500M) keyed to motor rotor shaft and bolted to motor stator frame. Note that mechanical backstop option requires an extended rear flange (and larger minimum Roller Length) for certain models.

Models 138E - 320L use a one-way motor rotor bearing in a standard motor stator and do not require an extended rear flange. Models 320M - 500M add a backstop to the stator within an extended rear flange, as shown. Models 500H - 800H add a backstop to the stator within a standard rear flange.



## Marl Pit at Cement Plant (South Carolina—USA)

Installed in 2002, this bucket wheel machine excavates marl at 1,000 TPH. It uses tail-mounted 31.5" diameter 100 HP Motorized Pulleys to drive the 54" wide boom and tail conveyor belts at 600 fpm. FAM specified Motorized Pulleys with "external brake shaft option" because conveyors can articulate +/- 16° and mechanical backstops could not be used. Externally mounted brakes (by others) prevent material "rollback" when conveyors are stopped.

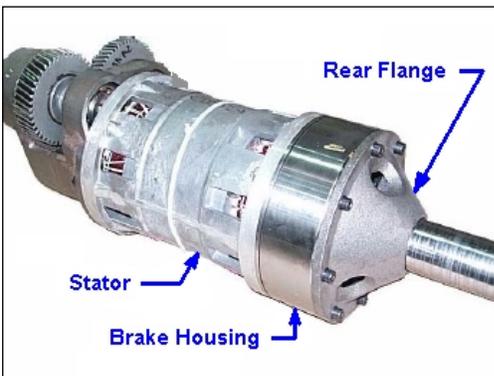
**Technical Precaution:** Control circuit must be designed so that motor and brake never work against each other. Brake should never be clamped shut when motor is on except for "emergency stop." Motor should never be powered on when the brake is clamped shut.



## Example of External Brake (South Carolina—USA)

Available in models 500H and larger, Rulmecca external brake shaft option extends motor rotor shaft through hole in non-rotating pulley shaft for attachment of external brake (by others.) This hydraulically-actuated double-shoe brake (protective cover removed for photograph) prevents conveyor roll back when fully loaded belt is stopped.

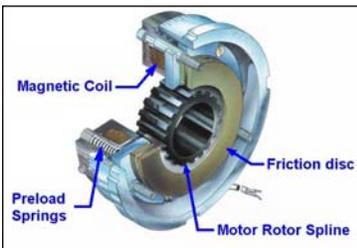
The external brake option provides one of the two key advantages available with the internal brake option. Brake has all of the mechanical advantage of the drive (as high as 100:1 ratio) because it is fixed directly to the motor rotor shaft. It is, however, exposed to the environment.



## Rulmecca Internal Brake/Motor/Gearbox Assembly

Spring-loaded electromagnetic brakes are designed to release when power is applied to the brake coil. This "fail safe" feature clamps brake shut when brake power is removed (either during normal operation or during an emergency loss of overall system power.) Photo shows 320H model.

**Technical Precaution:** Control circuit must be designed to stop pulley motor before brake clamps shut and start pulley motor after brake is released. Brakes are DC-powered and supplied with AC to DC rectifiers. Control circuit must be designed to kill motor power in the event of loss of brake power. If this provision is not made, motor can possibly "power through" clamped brake.



## Rulmecca Internal Brake

Rulmecca internal brake is designed to function primarily as a belt holding device for reversing and/or articulating conveyors. The brake is not intended to be a conveyor stopping device. The brake's keyed spline is fixed to the motor rotor and the brake's housing is bolted to the motor stator frame.

Fixing the brake to the motor rotor shaft, on the input side of the gearbox, yields two advantages: the brake has all of the mechanical advantage (as high as 100:1), and it is protected in a hermetically sealed environment.



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