

Subject: Winding Overview	Product: A1000 or G7 Drives	Doc#: AO.AFD.68
Title: Winding		

Winding

Application Overview

Winding is a procedure to take up and package material in roll form, for more efficient handling or in preparation for a subsequent operation. In a typical industrial use, a winder is employed to roll up a continuous or limited length of material such as wire, paper, film, metal or textiles. The winder and finished roll are referred to by different names in different industries.

<u>Industry</u>	<u>Winder Name</u>	<u>Roll Name</u>
Paper, Textile, Film	Winder	Roll
Wire	Takeup, Reeler	Reel
Wire	Spooler	Spool
Metal	Coiler	Coil
Textile	Beamer	Beam

Wound materials may be stretchable or non-stretchable. Winding of stretchable materials is more complex and critical than non-stretchable materials. Selection of winder drives for stretchable materials require considerable analysis and factory consultation is often required.

Materials typically wound include:

Wire and Cable	Textile Materials
Paper	Glass Fiber Materials
Business Forms	Plastic Film
Metals and Foils	
Metal	
Textile	

Generally, plastic film is extensible (stretchable) material, most other materials can be considered non-extensible. Rolls may be wound by applying drive torque at its center or its surface. As a result the two major categories of winders are:

-Center Winders

-Surface Winders

Winder drives are designed to improve the wound package and eliminate material breakage.

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Application Challenges:

- Control of a motor under dynamically changing requirements
- Acceleration to a fixed speed, deceleration to zero speed
- Changes in speed and torque during operation
- Detailed sequencing for flying splices and roll changing
- Speed and torque need to be controlled
- High process speed
- Wide speed range
- Changes in processed material

Yaskawa Products:

Product	Feature	Benefit
A1000 or G7 Drives	PID Control Mode	Line velocity control and diameter consistency can be achieved using the drives PID Mode with dancer position sensors, velocity sensors or diameter sensors.
	Cooling Fan On/Off Control	Controlling the number of times the drive fan is switched on and off increases the lifespan of the cooling fan and reduces the need for maintenance.
	Flux Vector Control and Torque Control Mode	Both torque and constant tension control are possible by using Closed loop Vector Control and Torque Control Mode.
	Zero Servo Mode	The Zero Servo Function in Closed Loop Flux Vector keeps the wire from becoming slack, eliminating the need for a mechanical brake.
	Kinetic Energy Braking (KEB)	KEB braking function can decelerate the application to stop without damaging the load, even when a power outage occurs. Simply coasting to stop can cause the wire to build-up or break.
	Torque Detection	Undertorque Detection senses wire breaks so that the drive can automatically stop the application immediately.

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Application Details:

The winder drive supplies the necessary torque at a controlled speed to accomplish material windings. Different materials require different tensions during winding, with plastic films very light and cable and steel very heavy tensions. Some materials such as plastic films and papers will elongate and separate if over-tensioned.

Winder drives are classified by their method of control and include:

- Constant Tension Center Winder (CTCW)
- Line Speed
- Dancer Position (pot or transducer)
- Torque Regulated Speed Follower (TRSF)
- Hyperbolic or Differential

Typical processes or sectional machines that include winders:

- Printing press in paper and film
- Wire insulation line in wire
- Galvanizing line in metals
- Casting or extruding line in film