

HITACHI LOW VOLTAGE DRIVE FOR WINDER APPLICATION

ABOUT HITACHI VARIABLE FREQUENCY DRIVE

With a vision of “To be recognized as the most trusted Power Electronics Company by supplying superior products and services”, Hitachi Hi-Rel Power Electronics Private Limited has garnered a significant level of trust in Indian power electronics market segment wherein it serves the entire gamut of Industries.

Variable Frequency Drive (VFD) is a type of adjustable speed drive used in electro-mechanical drive systems to control AC motor speed and torque by varying motor input frequency and voltage. VFDs are used in applications ranging from small appliances to the largest of mine mill drives and compressors.

Hitachi have proven & very rich experience in manufacturing & supplying drives & automation products with complete customized solutions serving various Industries i.e. Power, Steel & Metal, Cement, Oil & Gas, Mining, Sugar, Pulp & Paper, Water & Waste Water, Rubber, Plastic, etc.

ABOUT WINDER APPLICATION

Winders are commonly used in several industries including paper, plastic film, printing, wire & cable and metals. Precise speed/tension control is crucial to achieve accurate web thickness, product composition and smooth winding in a winder application. Common winder configurations are center wind, surface wind, turret wind and traverse wind. Hitachi offers a wide range of AC Variable Frequency Drives (VFDs) with options to meet the control needs of different winder configurations.

Industry	Winder Name	Roll Name
Paper, Textile, Film	Winder	Roll
Wire	Take-up, Reeler	Reel
Wire	Spooler	Spool
Metal	Coiler	Coil
Textile	Beamer	Beam



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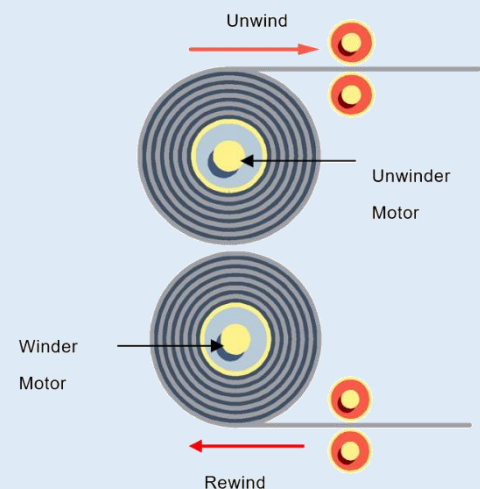
Wound materials may be stretchable or non-stretchable. Winding of stretchable materials is more complex and critical than non-stretchable materials. Selection of winder drives for stretchable materials require considerable analysis and factory consultation is often required.

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

Types of Winder:

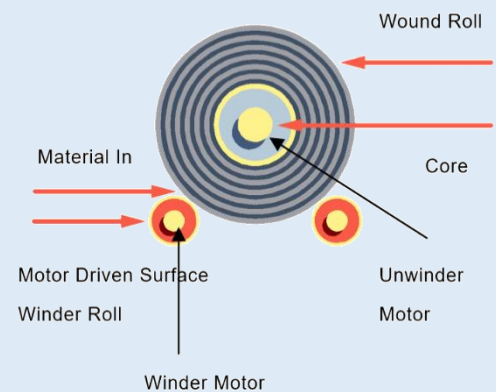
1. Center Winder:

Center winders offer an efficient way to produce high-quality rolls of sensitive webs that have uneven thickness into small- to medium-sized finished roll diameters. A center winder winds material around a core, or mandrel. It is called a center winder because the center of the coil is driven by a motor. Finished roll formation can be adjusted by varying both **nip** and **tension** on center winders that are supplied with layon rollers. The center winders are current regulated and layon rollers are speed regulated. Both of these can add dancers and load cells to provide very precise tension control.



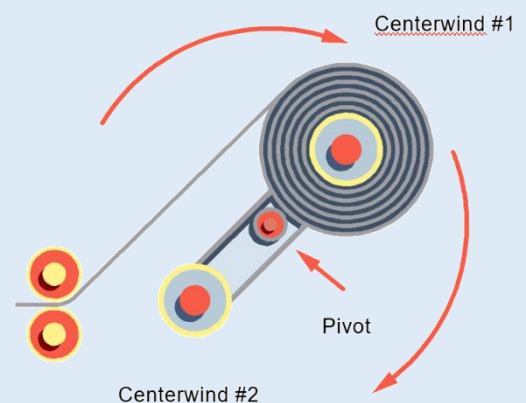
2. Surface Winder:

Surface winders drive the material roll from its surface to wind material. Surface winders run at a constant line speed, and use the roll diameter for compensations. Some surface winders have a companion roll that will have load share (with adjustable balance). Other configurations of surface winders may use a series of belts or rolls to hold the coil while it builds.



3. Turret Winder:

Turret winders are actually 2 or more center-winders on a rotating axis that allows the next winder to be in position and ready to start a new roll on the fly. A flying knife will slice the process material and automatically hold the material in place while it starts to wrap on the new coil. The diameter calculation needs to hold while the turret moves in either direction in order for this operation to be successful. As Center winder #1 builds, the center winder pivots to have center winder #2 ready to start to wind on the fly.



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CHALLENGE/ISSUES (What are the issues the customer used to face?)

- Precise speed control.
- Precise tension control between Winder and un-winder motors.
- Control of motor under dynamically changing conditions.
- Changes in Speed and torque during operation of motor.
- High Process speed.
- Wide speed range.
- Continuous operation.

HITACHI SOLUTION (How it helps in solving the Challenges/Issues?)

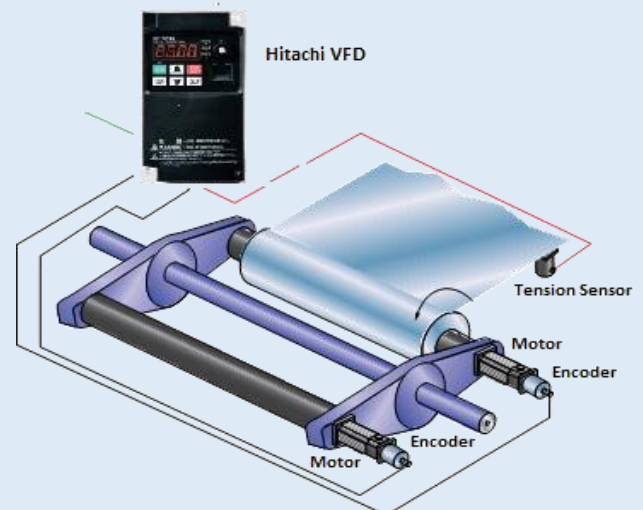
The winder VFD delivers the necessary torque at a controlled speed to accomplish material windings. Different materials require different tensions during winding. E.g. plastic films required very light tension while cable and steel required very heavy tensions. Some materials such as plastic films and papers will elongate and separate if over-tensioned.

Winder drives are classified by their method of control which includes:

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

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



BENEFITS OF USING HITACHI LV DRIVE IN WINDER APPLICATION

- Provides both speed control and tension control in winder with very fast speed synchronization of take-off motor and winder motor
- Increase productivity and make easy replacement of completed winder.
- Easy operation and very easy wiring of all control logic.
- Provides great tension control with full flexibility of tension.
- Highest resolution of tension and speed regulation.
- No wiring required for speed synchronization.
- Peer to Peer communication (Speed 115200bps) function make data transfer very fast.
- No nuisance tripping by Hitachi's Great trip avoidance function.
- Fully protection of motor from heating by electronic thermal protection and online auto-tuning function.
- No jerk and vibration in starting and Running of motor due to very smooth S-curve and frequency hold function at very low speed near 0.1Hz.

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- Over voltage suppression in take-off motor protect drive from over voltage tripping. Common DC feature are available for that.

HITACHI LOW VOLTAGE DRIVES FOR WINDER APPLICATION

SJ Series IN1 Low Voltage Drive

Range: 75 kW to 315 kW

- A High Performance drive for the most demanding applications
- Reduce costs for spare controllers
- Reduce trips on acceleration and deceleration
- Easy customization with “Slot-in” option cassette
- Hitachi’s Pro Drive Next Software
- Inverter-to-Inverter communication



WJ200N Series Low Voltage Drive

Range: 0.2 kW to 18.5 kW

- High starting torque of 200% or greater achieved using sensorless vector control
- Dual Rating
- Trip Avoidance Functions
- Simple Positioning Control
- Induction motor & Permanent magnet motor control with one inverter series
- Ease of Maintenance
- Ease of Use
- Various Versatile Functions



HH10 Series Low Voltage Drive

Range: 0.2 kW to 2.2 kW

- Independent air duct design
- Multi-function and easy to use
- TUV SUD and reliable quality assurance
- V/f control
- Natural cooling
- Standard Modbus communication
- Built-in PID
- 16 steps multi-step speed control
- Flexible V/f curve setting
- Multi-function I/O terminal (the delay time can be set)
- Fault protection at overcurrent overvoltage, undervoltage, overtemperature and overload with detailed fault information
- DC braking, flux braking and inbuilt dynamic braking
- Overcurrent and overvoltage stall, stronger load adaptability



ABOUT HITACHI HI-REL POWER ELECTRONICS PRIVATE LIMITED

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Founded & established in 1983 as Hi-Rel Electronics Pvt. Ltd., which later on in year 2015 had become the 100% subsidiary company of Hitachi, Japan which is one of the Global fortune 500 companies with a new name as Hitachi Hi-Rel Power Electronics Private Limited, which is being recognized as one of the pioneers in power electronics domain. Hitachi Hi-Rel, today, is a leading manufacturer of Industrial UPS, IT & Infra UPS, Medium & Low Voltage Variable Frequency Drives, Grid Tied Solar Inverters, Air Compressors and Railway Inverters.

Hitachi Hi-Rel has state-of-the art manufacturing facility at Sanand near Ahmedabad in Gujarat-India. Hitachi Hi-Rel is helping a wide array of industries and organizations to meet the mission critical demands through technologically superior, low polluting and innovative products Solutions and continue to offer world class power electronics products, value added services & customized solutions.

With a vision of “To be recognized as the most trusted Power Electronics Company by supplying superior products and services”, Hitachi Hi-Rel has garnered a significant level of trust in Indian power electronics market segment wherein it serves the entire gamut of Industries, particularly in mission critical applications for Refineries, Petro-Chemicals, Power Generation, Steel & Metals, and Process Industries as well as Critical Data Processing Applications. Besides offering greater energy efficiency & lower carbon footprint, each of the company product streams bears the hallmark of excellence with company accreditations. Hitachi Hi-Rel is an ISO 9001:2015, ISO 14001:2015 & ISO 45001:2008 certified company having export house status. Hitachi Hi-Rel sales network & service infrastructure expands out to the world & with this network, we have made strong inroad in Global markets like South East Asia, Middle East, Africa and Brazil. Also, with a presence of strategically located skilled service engineers in India helps us to score high in terms of customer expectations on service deliverables & uptime of the product.

With expertise, experience and an efficient product line, Hitachi Hi-Rel will always try to be your power electronics partner. When you choose to do business with Hitachi Hi-Rel, you are partnering with a company who cares.

FOR MORE INFORMATION

To know more about Hitachi Hi-Rel Power Electronics Private Limited and its offered products and solutions, please visit www.hitachi-hirel.com

You may also share your requirements at <https://www.hitachi-hirel.com/inquiry> to receive the phone call or Hitachi product information email from our authorized sales representative of your region.

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