

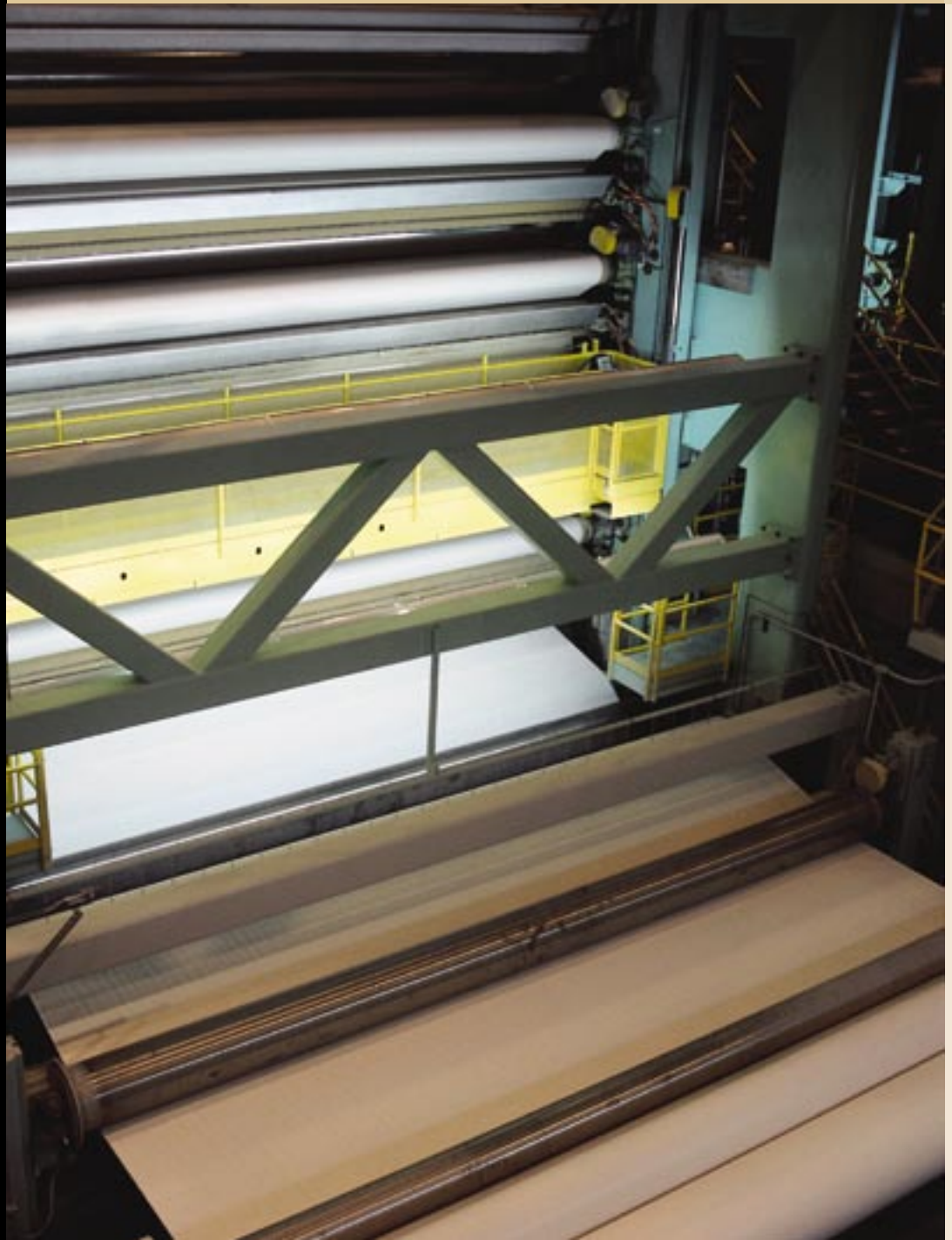


VISHAY INTERTECHNOLOGY, INC.

VISHAY SYSTEMS  
WEIGHING AND FORCE MEASUREMENT SOLUTIONS

## PULP AND PAPER APPLICATIONS

Vishay BLH • Vishay Nobel



CONTROL SYSTEMS

MARKET SOLUTIONS



# Pulp and Paper Applications

Process Weighing, Web Tension, and Force Control Systems

## Vishay Systems

### Vishay BLH • Vishay Nobel

#### Industry Leadership

Since the early 1970s, Vishay BLH and Vishay Nobel have been leading manufacturers of advanced measurement and control systems for the pulp and paper industry. Our history in the measurement field goes back to the 1940s, when our predecessors were pioneers in strain gage techniques and in transducers and amplifiers for industrial applications. Throughout the years, we have gained unique knowledge in the area of measurement and control, and were among the first to use microprocessor technology for industrial applications. In the late 1970s, we launched our own digital process control systems. We continue to build on this tradition of innovation.

#### Proven Experience

Patented web tension and force control systems have been designed and field-tested with major inputs from the pulp and paper industry. This guarantees that our turn-key solutions will meet your targets when it comes to productivity and functionality.

#### A Strong Partner

Vishay BLH and Vishay Nobel are part of the Vishay Systems division of Vishay Measurements Group, a leading manufacturer of equipment for force measurement and weighing applications. Our parent company, Vishay Intertechnology Inc., is one of the world's largest manufacturers of discrete semiconductors and passive electronic components.



Web tension measurement unit in dryer section



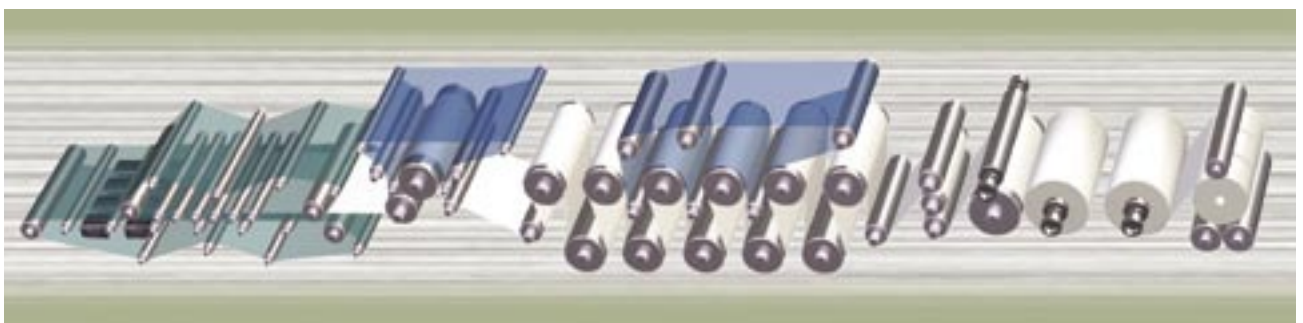
Relief cylinder for a reel



Load cell



Digital servo controller





# Pulp and Paper Applications

Process Weighing, Web Tension, and Force Control Systems

## Web Tension Systems

### Dynamic Resultant Force Measurement

Patented HTU universal web tension load cells, with capacities ranging from 2K to 20K Pounds, measure the resultant force in any direction and are not limited to horizontal or vertical component force. In addition, they do not require unique orientation to achieve maximum sensitivity. This permits the installation of identical load cells at multiple web tension zones regardless of the pillow block mounting or angle configuration of the roller. The low-profile cell is sealed to meet IP67 requirements, temperature compensated to 250 °F, and dead weight calibrated to precision accuracy. These features add up to zero maintenance, simple retrofit, and long-term reliability for machines that continuously process material in the paper industry.

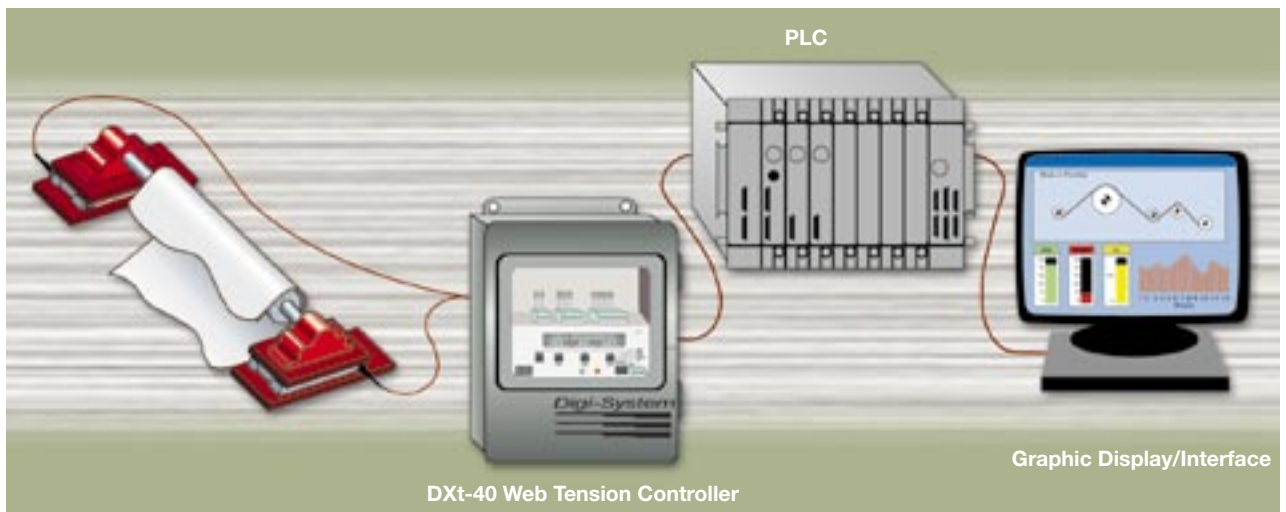
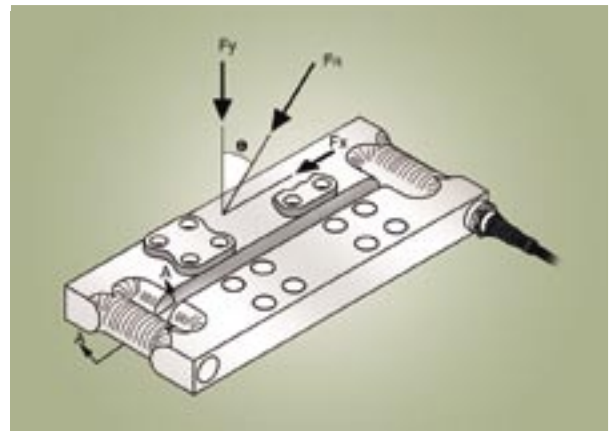


### Applications

- Calenders
- Breakers
- Felts
- Winders
- Rewinders
- Wire Sections
- Coaters
- Laminators
- Dryers

### Principles of HTU Operation

Force-sensing elements located on each end of the transducer measure the components  $F_x$  and  $F_y$  of  $F_R$  applied along the X and Y axes. Resultant output signals ( $F_R$ ) can be used to determine the magnitude and direction ( $\theta$ ) of the overall force applied by the web. Two full Wheatstone bridges are mounted internally to each tubular cross section to provide independent sensing for each axis, as well as protection from hostile environments.



DXt-40 Web Tension Controller

Graphic Display/Interface



## Force Nip Load

### Winders, Slitters, Rewinders, Calendars, and Press Section Force and Position Control

Vishay BLH and Vishay Nobel have been delivering systems for controlling nip loads for over 30 years. Our experienced engineers design system components such as force measurement blocks, cylinders, valves, and control units. This guarantees optimized performance that is independent of the type of machine on which the system is installed. The control unit is a digital, multi-channel, servo controller that is specially designed for fast force- and position-control loops.

The **Rider Roll System (RRS)** for winders and slitters is a force- and position-control system with separate controls for each side. The system features soft contact with the core, high nip-load accuracy, and dynamic force detection to prevent roll kickouts.

For rewinders, we can supply a system with correction for variable web width. This system is also available with single-channel pressure control.

The system for calendars is similar to the RRS, but includes correction for the changing angles of the arms.

The press-control system provides pressure and position control of the nip load in the press section or calendars.



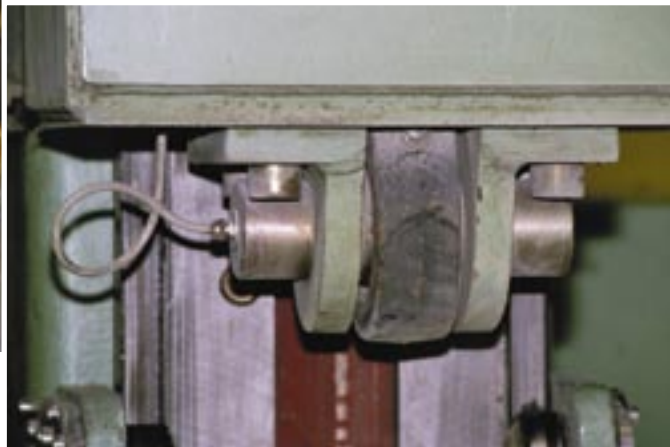
microPOS4 Digital Servo Controller



Winder with Rider Roll System RRS



Force transducer KISD mounted in the rider roll





## Reel Optimizing

### Nip Load, Density, Diameter Force, and Position Control

#### Measure, Control, and Optimize Your Reel

The patented Vishay Nobel **Reel Optimizing System (ROS)** is a hydraulic force and position control system developed to eliminate wrinkles and cracks during the critical shifting phase, and improve roll density. With load cells in the primary and secondary arms installed close to the spool, the system provides extremely accurate measurement of nip force.

The ROS gives your reel smooth and synchronized movement of the arm, and a correct nip load from the first meters in turn-up position to the complete roll length. This is accomplished by measuring and controlling the nip load forces and cylinder positions in both the primary and secondary arms.

#### Roll Density, Diameter, and Length

Roll density is measured and optimized by controlling the nip load. Online density measurement provides very fast feedback for optimizing the calender after line shut-downs, or when changing grades.

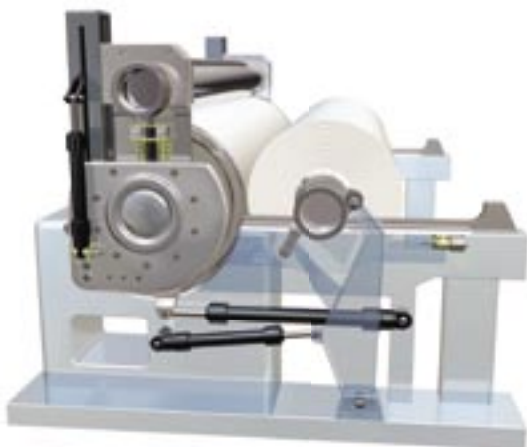
The system provides very accurate length and diameter measurement, and includes a feature for calculating the required tambour diameter for the scheduled winder sets.

#### Optimizing Logger

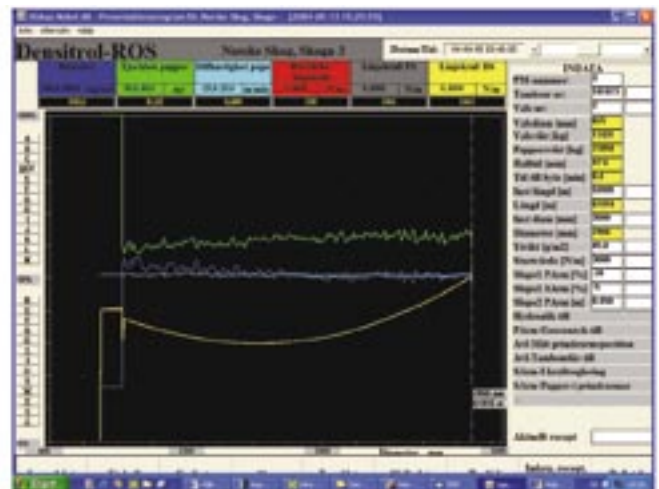
The system's optimizing logger stores data on a PC for analysis.



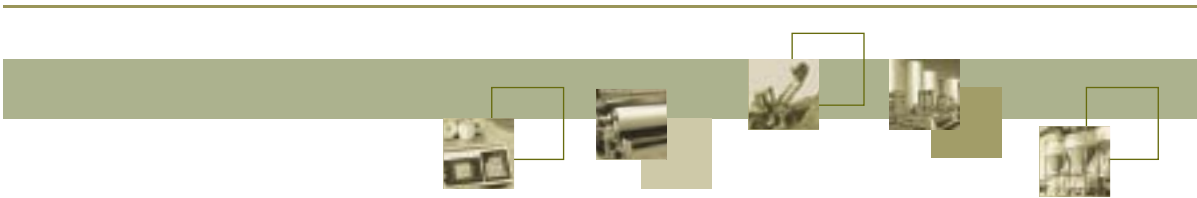
Reel with optimizing systems ROS



ROS system overview



Reel optimizing logger



## Disc Gap

### Refiners Position and Pressure Control

Vishay Nobel **Disc Gap Control (DGC) Systems** are installed in pulp and paper mills worldwide.

These systems were designed to fit most new disc refiners and enable easy retrofit of old ones.

Vishay Nobel offers two standard solutions:

The basic system incorporates a manual- or stepper-motor-controlled hydraulic servo valve, with mechanical feedback from the grinding plate and a transducer for measuring the disc position.

An electronic unit controls and monitors disc gap and wear. The gap can be set either manually or remotely. The position of the discs is maintained independent of load variations or loss of power.

Vishay Nobel also offers a more advanced electro hydraulic system with a digital servo position controller, servo valve, and feedback from position transducers for gap width and disc wear. A pressure loop control can also be included.

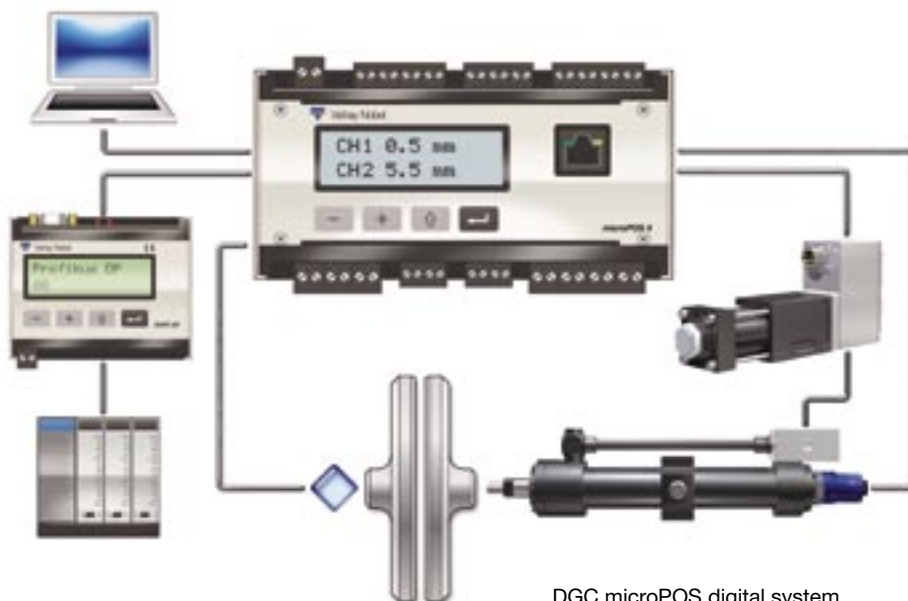
Interface to the DCS is made with either analog or binary signals, and digitally transmitted via serial or fieldbus communication.



SK 700 tracer valve



Disc refiner with SK 700 tracer valve



DGC microPOS digital system



## Weighing

### Paper Rolls, Pulpers, and Coating Kitchen

Vishay Nobel and Vishay BLH have four decades of experience in pulp and paper mill process control. In addition to providing precision force and web tension measurement for machine operation, we have extensive experience in mill process weighing and batching.

We provide weighing systems that reject side load forces introduced by thermal expansion and vibration. This guarantees high reliability and accurate production in coating kitchens.

We weigh finished “Jumbo” rolls with overhead crane scales or at fixed weighing stations. Conventional rolls are weighed on lifting tables after slitting and winding.

Pulpers and barking drums are weighed by high-capacity load cell systems that also control filling levels.

Our transducers and instruments are designed for easy installation and use, and provide excellent performance in harsh process environments.

Vishay Systems offers the broadest range of load cells and weighing instrumentation on the market. Providing customized solutions, special load cells and instrumentation software modifications is not an option; it is standard procedure with Vishay Systems.



Vishay Nobel KIS and TAD3



Vishay BLH KDH and LCp-104



Tambour weighing



**VISHAY MEASUREMENTS GROUP:**

Vishay Micro-Measurements  
Vishay Transducers  
Vishay Systems—Weighing and Force Measurements



The World's Largest  
**Manufacturer**  
of Weighing and Force Measurement Transducers

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