



VISHAY INTERTECHNOLOGY, INC.



VISHAY SYSTEMS  
WEIGHING AND FORCE MEASUREMENT SOLUTIONS

## WEB TENSION SYSTEMS

Vishay BLH • Vishay Nobel

CONTROL SYSTEMS

PRODUCT OVERVIEW





# Force and Web Tension Solutions

Vishay Systems

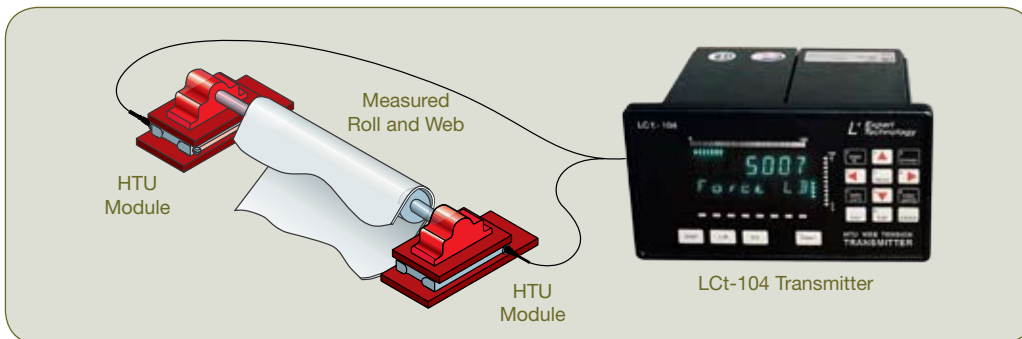
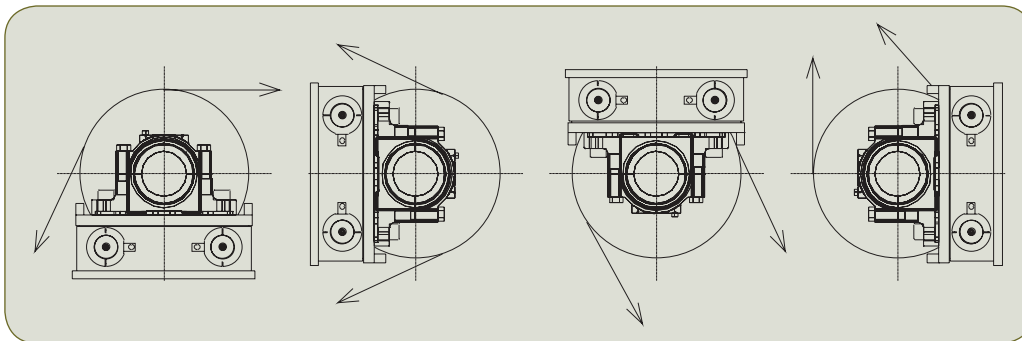
For over 40 years, Vishay Nobel and Vishay BLH have supplied web tension and force measurement systems for paper machines, the steel industry, and converting machines to customers all over the world. A natural result of this, we have acquired solid knowledge and experience within these areas.

Vishay Systems is a leading manufacturer of products and systems for weighing and force measurement and control. Our web tension systems comprise standard modules and electronics, as well as customized systems. We design force measurement modules according to the customers' mechanical requirements and forces, ranging in size from just a few Newtons to mega-Newtons.

The combination of digital signal amplifiers and stable force transducers means that our systems can handle anything from applications with a low tare and large forces, to those with a large tare and small forces. Our HTU and other measurement modules measure forces on both the X and Y axes. By using our electronics, we can compensate for varying wrap angles.

From steel and paper to plastic films, Vishay Systems specialists have installed thousands of standard and customized force and web tension systems. Our extensive knowledge helps us meet the present and future challenges.






Our experienced staff of sales engineers, system engineers, and service engineers understands your requirements and will provide solutions to meet your needs.









# Modules

For Force Transducers and Measurements

Web Tension Products	 GLT/LTT	 HTZ-3	 HTK	 KIS	 KIP
Measurement Range	90 N to 2200 N	2.2 kN to 222 kN	0.5 kN to 5 kN	1 kN to 500 kN	10 kN to 20 kN
Repeatability	0.02% RO	0.01% R.O	0.01% RO	0.01% RO	0.02% RO
Accuracy	0.05% RO	0.10% R.O	0.05% RO	0.02% RO	0.1% RO
Overload	100% RL	50%	50% RL	100% RL	100% RL
Measurement Angle	All	180°	Symmetrical	All	±45 deg
Temperature Range	-40°C to +105°C	-40°C to +105°C	-40°C to +105°C	-40°C to +80°C*	-40°C to +80°C*
Material	Stainless steel	Stainless steel	Stainless steel	Alloy/stainless steel	Stainless steel
Protection Class	IP67	IP65	IP67	IP67	IP67
Electrical Connection	Bendix	Cable 10 m	Cable 10 m	Cable 5/10 m	Cable 5 m
Approvals	FM, CSA	FM, CSA	FM, CSA	OIML, ATEX	ATEX

\*Up to 120°C, upon request.

Web Tension Products	 HTU	 PST-2	 FMU-1	 FMU-5
Measurement Range	9 kN to 90 kN	20 kN to 200 kN	2 kN to 200 kN	100 kN to 2000 kN
Repeatability	0.02% RO	0.01% RO	0.01% RO	0.02% RO
Accuracy	0.1% RO	0.1% RO	0.1% RO	0.1% RO
Overload	50% RL	100% RL	100% RL	100% RL
Measurement Angle	All	All	All	All
Temperature Range	-20°C to +150°C	-40°C to +80°C*	-40°C to +80°C*	-40°C to +80°C*
Material	Stainless steel	Alloy/stainless steel	Alloy/stainless steel	Alloy/stainless steel
Protection Class	IP67	IP67	IP67	IP67
Electrical Connection	Cable 10 m	Cable 5/10 m	Cable 5/10 m	Cable 10 m
Approvals	-	ATEX	ATEX	ATEX

\*Up to 120°C, upon request.





# Application Examples

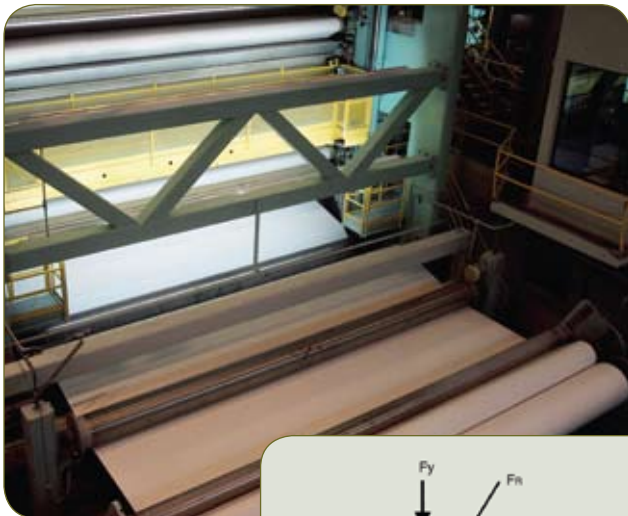
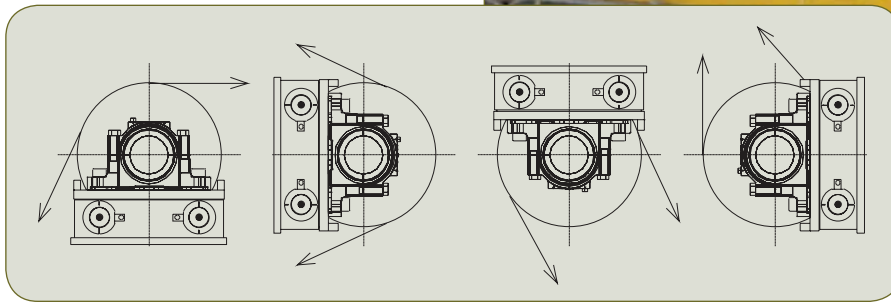
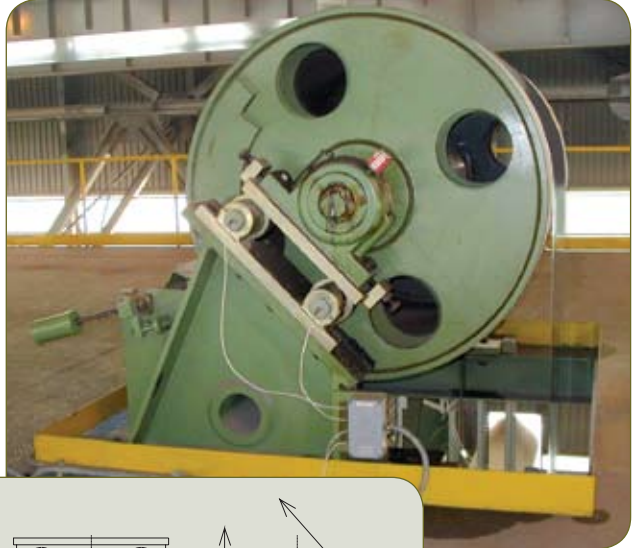
## Web Tension

### Steel Strip Winder with the FMU Web Tension Unit

Typical applications for the FMU unit:

- Paper machines
- Steel strip tension equipment
- Mining conveyors
- Felts, dryers, calendars, coaters, and laminators
- Winders and rewinders

FMU unit used in an annealing line for controlling the web tension of steel strip: The unit is mounted under the bearing and connected to a junction box and further to an instrument.

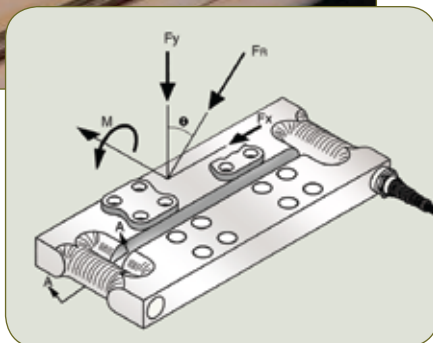


### Paper Production with the HTU Web Tension Module

Typical applications for the HTU unit:

- Paper machines
- Steel strip tension equipment
- Wall paper
- Mining conveyors
- Felts, dryers, calendars, coaters, and laminators
- Winders and rewinders

Fitting the HTU module under the bearing to control web tension of paper during production: The HTU measures force in both vertical and horizontal directions. This makes it possible to calculate the exact web tension and resulting force, even in the presence of alternating web angles. The low height of the HTU module makes it easy to fit into existing machines under a pillow block.





# Application Examples

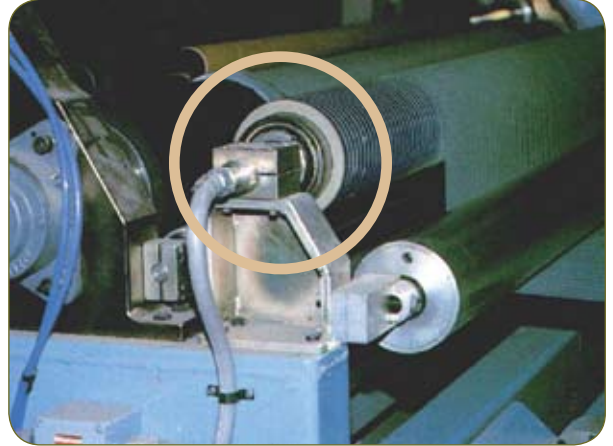
## Force Transducers

### Shaft Installation with the KIS Force Transducer

Typical applications for the KIS unit:

- Paper tension
- Steel tension
- Plastic film, woven, or filament tension measurement

Replacing the shaft in a roller with internal bearing by a KIS load cell to measure the force caused by the tension in the paper or steel during production: Since the load cell can be rotated, the full resultant force can be measured.

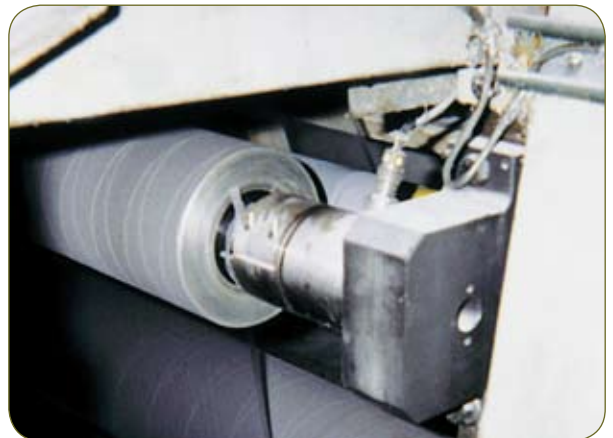


### Shaft Installation with the GLT/LTT for Low Tension Measuring and Control

Typical applications for the GLT/LTT unit:

- Paper tension
- Tension in printing press
- Plastic film, woven, or filament tension measurement

Replacing the pillow block with a GLT or a LTT on a dead-end shaft roller to measure the force caused by the tension in the paper, plastic film, etc., provides highly accurate measurement of lower forces. The load cell can be rotated to measure the full resultant force.

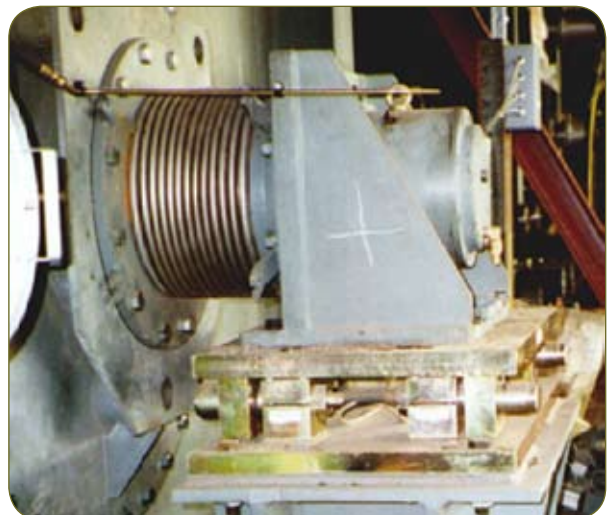


### PST-2 Installation on the Pillow Block

Typical applications for the PST-2 unit:

- Web tension steel strip in galvanizing and hardening/annealing furnace

PST web tension units placed underneath the pillow block to measure the web tension force: The design of the unit enables measurement on the roller with great thermal expansion without measuring disturbing forces.





# Instruments

## Transmitters, Indicators, and Controllers

Products	Features
<b>G4</b> 	<ul style="list-style-type: none"> <li>• Multi-channel instrument</li> <li>• Measurement, summation, angle calculation, and regulation</li> <li>• Real time</li> <li>• Bandwidth 1 kHz</li> </ul>
<b>DXt-40 Series Web Tension Transmitter/Controllers</b> 	<ul style="list-style-type: none"> <li>• Continuous display of left, right, or total tension</li> <li>• Individually digitize each transducer in a multicell system for greater resolution and accuracy</li> <li>• Continuous diagnostics of system performance</li> <li>• Displays the resultant force and angle of inclination for any wrap angle (Model HTU)</li> </ul>
<b>LCp-100 Series Web Tension Indicator/Transmitter</b> 	<ul style="list-style-type: none"> <li>• Designed for precise high-speed applications (120 updates/second)</li> <li>• Connects easily to any PLC, DCS, or PC-based process control system</li> <li>• FM- and CSA-approved for Division 2 hazardous locations</li> <li>• CE-marked</li> </ul>
<b>PS-2010</b> 	<ul style="list-style-type: none"> <li>• High performance tension transmitter</li> <li>• DIN rail mount</li> <li>• 120 samples per second</li> </ul>
<b>AST 3PF</b> 	<ul style="list-style-type: none"> <li>• Single-channel instrument with high resolution</li> <li>• Installation via PC or panel</li> </ul>
<b>microPOS</b> 	<ul style="list-style-type: none"> <li>• Dual-channel instrument</li> <li>• Measurement, summation, angle calculation, and regulation</li> </ul>
<b>PS-1010T</b> 	<ul style="list-style-type: none"> <li>• Eliminates low tension signal drift</li> <li>• Simple system set up and calibration</li> <li>• Compact—lightweight DIN rail “snap track” installation</li> <li>• Independent zero and span adjustments</li> <li>• Bipolar uplifting or downward tension force measurement</li> </ul>
<b>DXt-15</b> 	<ul style="list-style-type: none"> <li>• Ruggedized, field mounted web tension transmitter</li> <li>• Integral multiple-transducer summing circuit</li> <li>• Digital filtering dampens vibration without reducing response time</li> <li>• 0 to 10 V, 4 to 20 mA, and RS-485 signal outputs</li> <li>• NEMA 4/4X enclosure standard</li> </ul>
<b>LCt-104</b> 	<ul style="list-style-type: none"> <li>• Individually digitized transducer forces for four web tension transducers (1-, 2-, or 4-zone configuration)</li> <li>• View left, right, and total; force, tension and angle values</li> <li>• 100% digital calibration—no dead weight loading and no strapping required</li> <li>• Online diagnostics significantly reduce downtime</li> <li>• Dynamic digital filtering for each tension zone</li> <li>• Total, individual, and difference output control signals</li> <li>• Four inputs, eight triac output relays, eight TTL logic outputs</li> <li>• Allen-Bradley Remote I/O, Modbus, DeviceNet, and Profibus interface</li> </ul>

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# Features and Applications

## Force and Web Tension Products

Products	Features	Applications
<b>HTZ-3</b> 	<ul style="list-style-type: none"> <li>Rugged stainless steel 'I' beam sensing section</li> <li>Resultant forces measure in the up or down direction</li> <li>Full Wheatstone bridge with Vishay SR-4<sup>®</sup> foil strain gages</li> <li>Factory calibration eliminates need for on-site test weights</li> <li>Optional adapter plate designed for on-site installation of overload safety stops</li> <li>FM and CSA approved</li> </ul>	<ul style="list-style-type: none"> <li>Paper producing machines</li> <li>Roofing shingle manufacturing</li> <li>Printing presses</li> <li>Laminator zones</li> <li>Dryer zones</li> <li>Coating zones</li> <li>Felt measurement</li> </ul>
<b>GLT and LTT</b> 	<ul style="list-style-type: none"> <li>90 N to 2200 N</li> <li>Low tension applications</li> <li>Direct shaft measurement</li> </ul>	<ul style="list-style-type: none"> <li>Web tension plastic film or woven material</li> <li>Web tension filament</li> <li>Tension measurement printing press</li> </ul>
<b>KIS Force Transducer</b> 	<ul style="list-style-type: none"> <li>1 kN to 500 kN</li> <li>Medium forces</li> <li>Replaces existing shafts</li> <li>Can be rotated to measure full resultant force</li> </ul>	<ul style="list-style-type: none"> <li>Web tension paper machine, steel strip plastic film, and woven material</li> </ul>
<b>KIP Force Transducer</b> 	<ul style="list-style-type: none"> <li>10 kN to 20 kN</li> <li>Simple installation</li> <li>Robust with low deflection</li> </ul>	<ul style="list-style-type: none"> <li>Web tension and tension profile measurement paper, plastic film, and woven material</li> </ul>
<b>HTU Measurement Module</b> 	<ul style="list-style-type: none"> <li>Capacities from 2 Klb to 20 Klb (9 kN to 90 kN)</li> <li>Dual-axis transducer design enables measurement of resultant force in all directions without limitation to horizontal or vertical components</li> <li>Functional to 250°F (121°C)</li> <li>Sealed to IP67: field-proven design</li> <li>Low profile: direct load cell replacement with simple retrofit installation</li> <li>Factory-calibrated for minimum start-up time</li> </ul>	<ul style="list-style-type: none"> <li>Web tension measurement paper, plastic film, and woven material</li> <li>Nip force measurement</li> <li>Felts</li> <li>Dryers</li> <li>Mining conveyers</li> <li>Coaters</li> <li>Laminators</li> <li>Winders and rewinders</li> </ul>
<b>PST-2 Measurement Module</b> 	<ul style="list-style-type: none"> <li>Capacities: 20 kN to 200 kN</li> <li>Measure exact resultant web tension force</li> <li>Allows for great thermal expansion of roller</li> <li>Superior accuracy for heavy rolls with small wrap angles</li> <li>Units customized to fit existing applications—no reconstruction required</li> <li>High temperature units: functional to 100°C</li> <li>Special units designed to meet any application need</li> </ul>	<ul style="list-style-type: none"> <li>Web tension measurement on steel strip in galvanizing or hardening/annealing furnace lines</li> </ul>
<b>FMU-1 Measurement Module</b> 	<ul style="list-style-type: none"> <li>Measure exact resultant web tension force</li> <li>Superior accuracy for heavy rolls with small wrap angles</li> <li>Units customized to fit existing applications—no reconstruction required</li> <li>High temperature units—functional to 100°C</li> <li>Special units designed to meet any application need</li> </ul>	<ul style="list-style-type: none"> <li>Paper machines</li> <li>Steel strip tension</li> <li>Mining conveyers</li> <li>Felts</li> <li>Dryers</li> <li>Calendars</li> <li>Coaters</li> <li>Laminators</li> <li>Winders and rewinders</li> </ul>
<b>FMU-5 Measurement Module</b> 	<ul style="list-style-type: none"> <li>Customized and compact unit for higher forces</li> <li>Measure exact resultant web tension force</li> <li>Superior accuracy for heavy rolls with small wrap angles</li> <li>Units customized to fit existing applications—no reconstruction required</li> <li>High temperature units—functional to 100°C</li> </ul>	<ul style="list-style-type: none"> <li>Paper machines</li> <li>Steel strip tension</li> <li>Mining conveyers</li> <li>Felts</li> <li>Dryers</li> <li>Calendars</li> <li>Coaters</li> <li>Laminators</li> <li>Winders and rewinders</li> </ul>



**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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