



VISHAY INTERTECHNOLOGY, INC.



VISHAY SYSTEMS
WEIGHING AND FORCE MEASUREMENT SOLUTIONS

ROLL FORCE MEASUREMENT AND CONTROL SYSTEM

Vishay BLH • Vishay Nobel

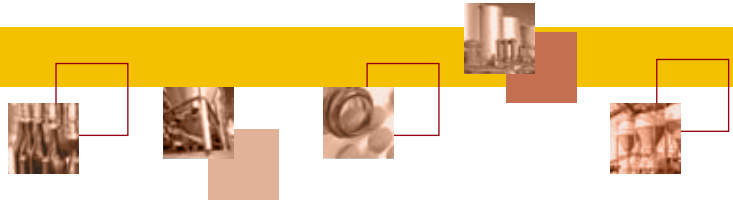


CONTROL SYSTEMS

PRODUCT OVERVIEW



Advantages



Designed for Easy Installation on Any Mill, Old or New

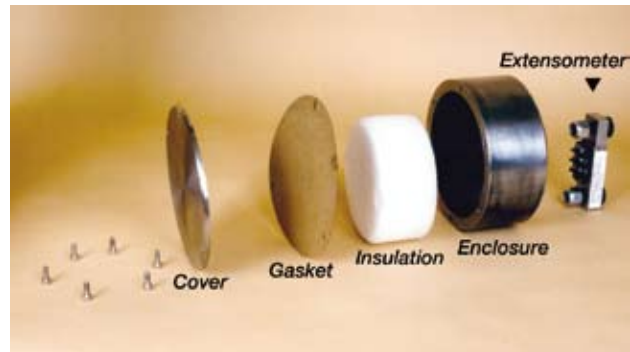
Vishay roll force systems have a unique design that enables them either to be used to retrofit older mills or be applied directly, as original equipment, to new mills. In both cases, extensometer kits weld directly to existing posts, so no additional mill modification is required.

Extensometers Govern the Accuracy of the Roll Force Measurement System

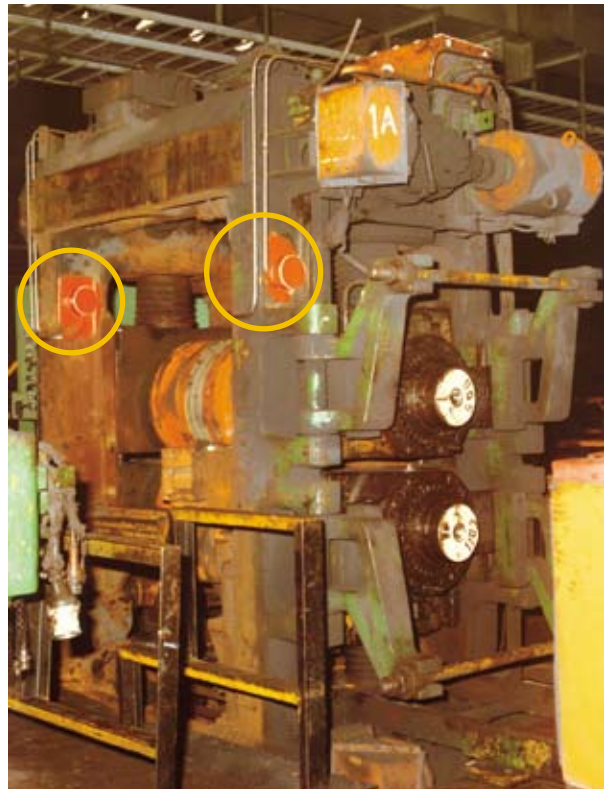
Although similar in operating principal to a load cell, an extensometer is calibrated in strain (or stretch) instead of load. Actually, while maximum roll force can vary considerably from mill to mill, post strain remains within a range of 33 to 130 microinches per inch. Vishay extensometers are designed for optimum performance over this range.

With extensometers installed, the mill posts become an active part of the measuring system. The entire mill housing with the attached extensometer can be considered a "load cell." Installing extensometers on both the work and drive sides of the mill enables the user to achieve a balanced force at all times.

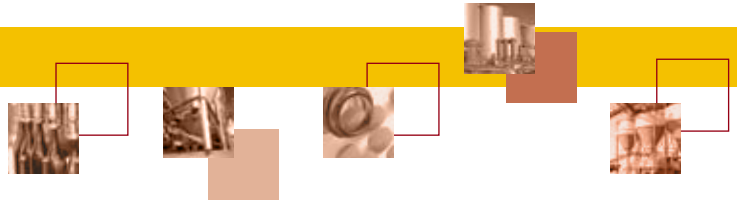
The RFS-3 instrumentation system provides vital status/ alarm indication and work/drive force measurement output signals. In the rare event of an extensometer failure during rolling operation, system software highlights the failing channel and electronically compensates for the loss until the unit is replaced. No production time is lost.



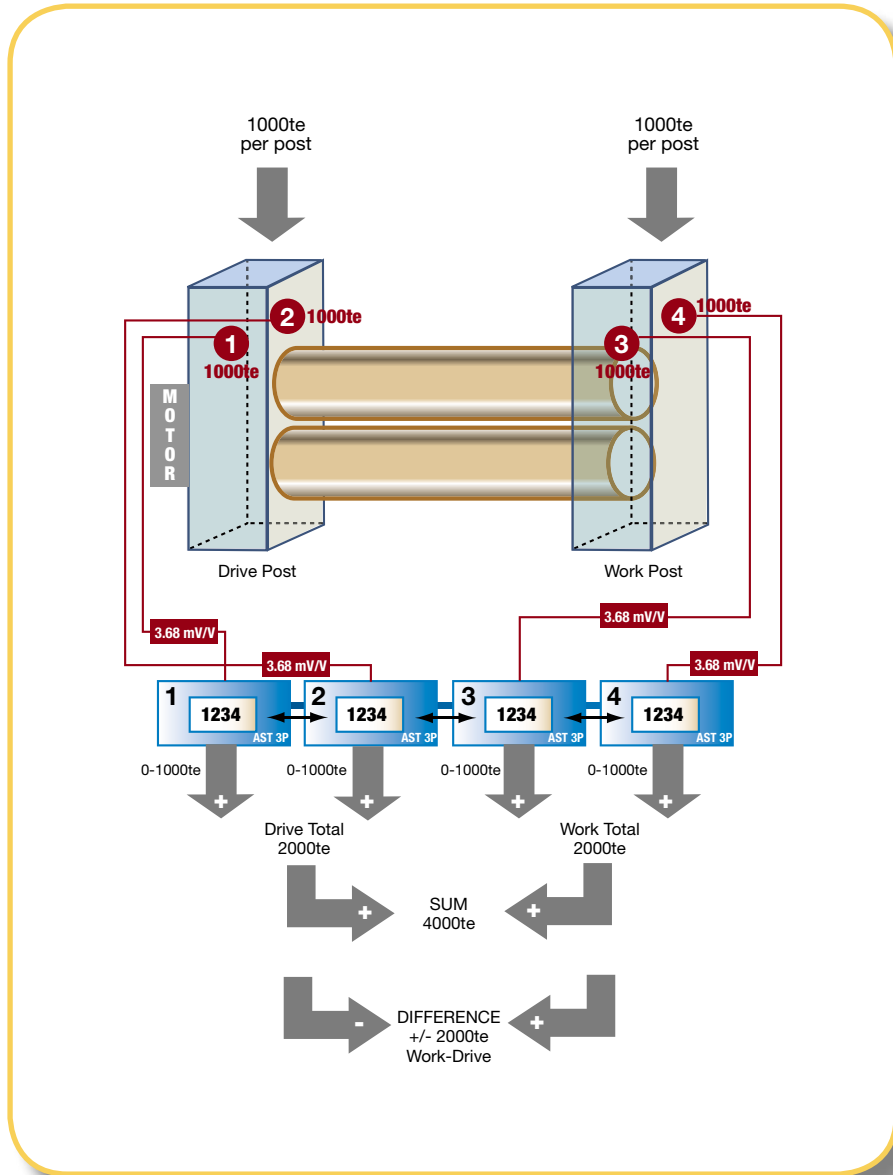
Extensometer Kit



Typical four-kit installation with two extensometers on the work side and two on the drive side.



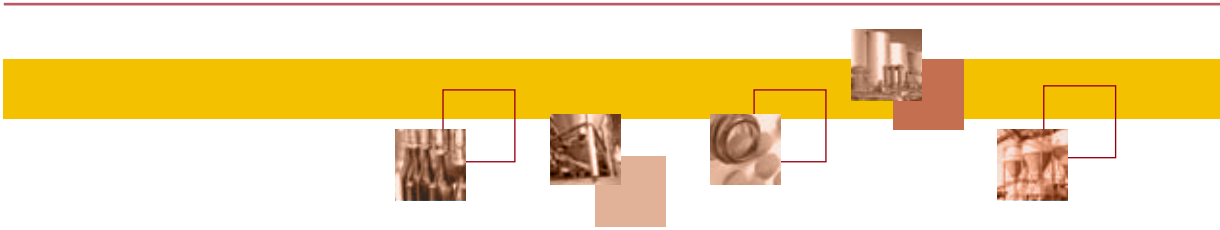
Typical System Overview



System Description

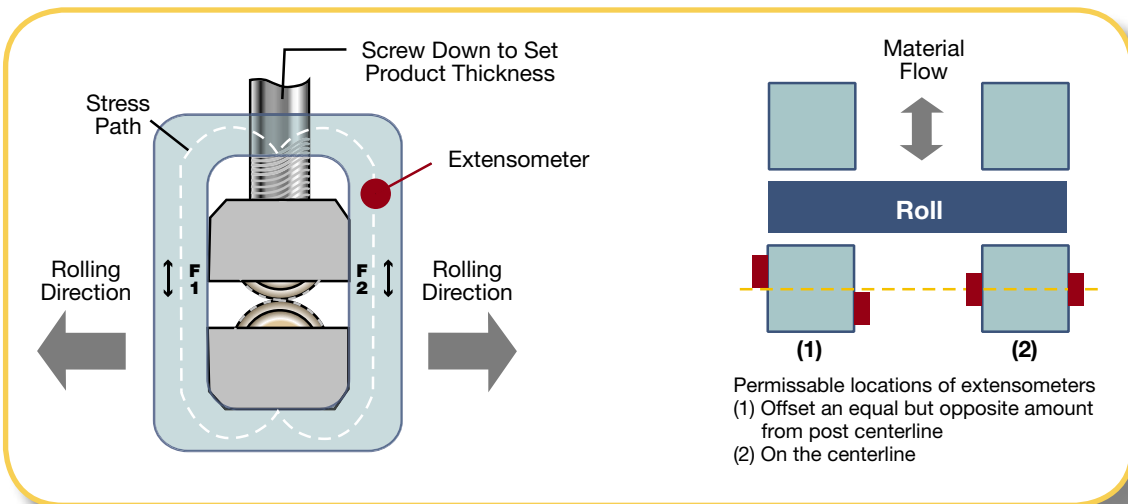
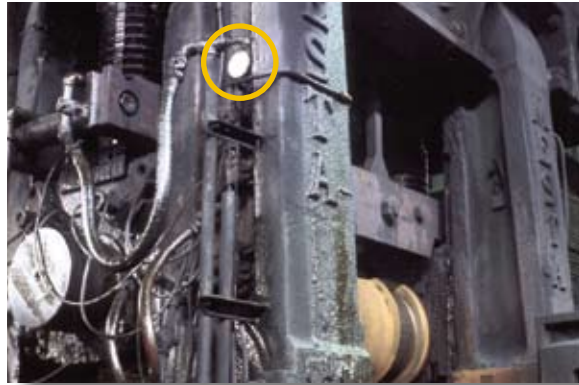
Rolling mill separation forces are measured accurately and conveniently with the Vishay Nobel RFS-3 system, which is the product of many years of continuous development and improvement.

Extensometers on the mill posts provide an electrical signal proportional to the mill separation force. The extensometers typically are installed on both sides of both mill posts to ensure that forces on the drive and work sides of the mill are balanced. Standard configuration requires four extensometers, installed as depicted above, to eliminate bending error. However, in some cases only two mounting locations are available. Roll force can be measured with only two extensometers, provided that one unit is mounted on each post. If this configuration is used, extensometers must be mounted symmetrically, i.e., both on the inside or both on the outside of the mill posts.



Measurement Locations

Errors due to mill-post-bearing chock friction can be virtually eliminated by placing the extensometers on or close to the pass line. However, if this is not possible, they can be mounted higher or lower than the pass line, as long as the distance is reasonable. Wherever possible, extensometers should be mounted centrally on the post. If this presents a problem, an equal offset in opposite directions helps to cancel post bending effects. Extensometers bolt onto two studs that are welded to the mill posts. A rugged enclosure is then welded into place over them. Signal cabling is routed to the RFS-3 instruments via a conduit.



Instrumentation

RFS-3 systems use a specially designed rack designed for four Vishay Nobel AST 3P signal conditioning units. AST 3P modules are housed in a rugged 19" rack that fits into a standard cabinet. Alternatively, a custom enclosure can be made to order.

Special AST 3P units read extensometer signals from both sides of the mill and amplify them. All four amplifiers are connected to a Modbus interface that allows them to exchange data. Sum (total), difference (work-drive), work total, and drive total values can be displayed on any unit. Analog signal outputs for each value are available on the rear panel rack terminals. Separate relay outputs are provided for "Metal in the Mill" and "Mill Overload" conditions.

Vishay Nobel Deltacom interface software (supplied at no charge) provides PC access and storage capability. All outputs and settings for each AST 3P can be viewed, uploaded for storage, and subsequently downloaded into a replacement unit, if necessary.



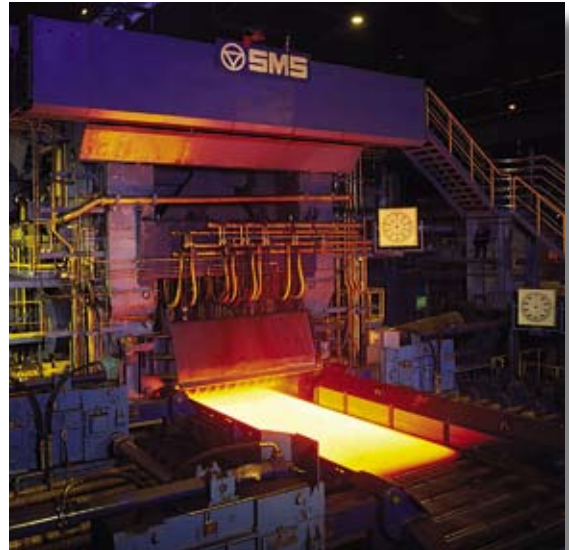


Roll Force Measurement Systems Increase Productivity

- Increases roll life
- Prevents mill overloads
- Improves product quality
- Reduces mill downtime
- Simplifies retrofit

Installing extensometer-based systems on mills not originally equipped with load cells has obvious advantages, considering the expensive and time-consuming alternatives. Equally important is the fact that extensometer-based systems offer significant advantages for installation on new mills as well. The cost of an extensometer-based system is 50% less than the cost of a load-cell-based system, and installation is much easier.

Unlike load cells, extensometers cannot be damaged by accidental mill overloads.



Simple System Components

A complete roll force measurement system consists of an RFS-3 instrument package and four extensometer kits that weld directly to existing mill posts. Each extensometer senses strain (or stretch) in the mill post and transmits an electronic signal to the instrument. An RFS-3 instrument package reads the force signals from each extensometer and provides vital status/alarm indication as well as work and drive force measurement.



RFS-3 Instrument Features

- Total and differential measurement
- Metal in the mill and overload alarms
- Analog output signals representing total, differential, work, and drive forces
- Instrumentation enclosure



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Vishay Systems—Weighing and Force Measurements



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