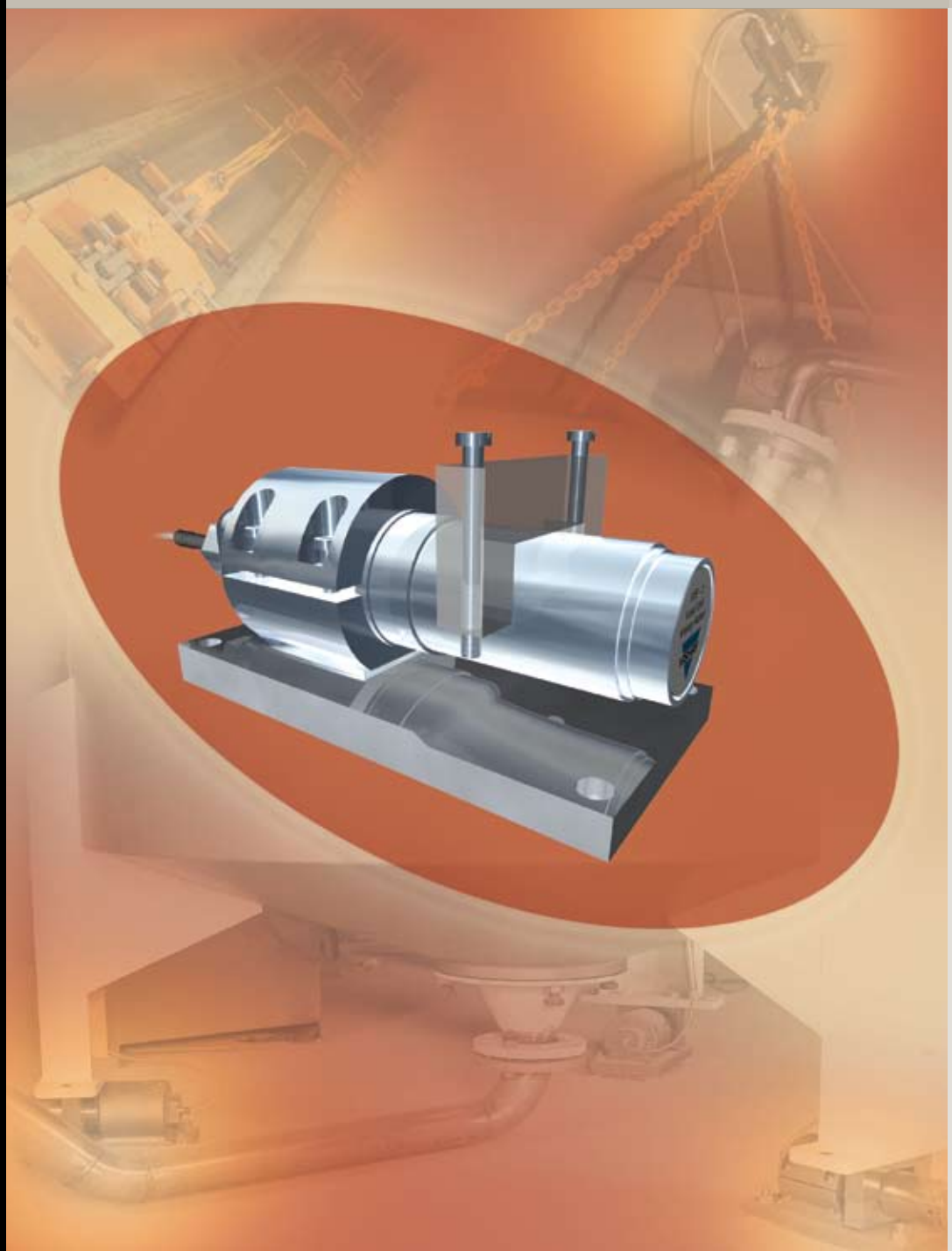
VISHAY INTERTECHNOLOGY, INC.

VISHAY SYSTEMS
WEIGHING AND FORCE MEASUREMENT SOLUTIONS

THE KIS PRINCIPLE

Vishay Nobel



CONTROL SYSTEMS

MARKET SOLUTIONS

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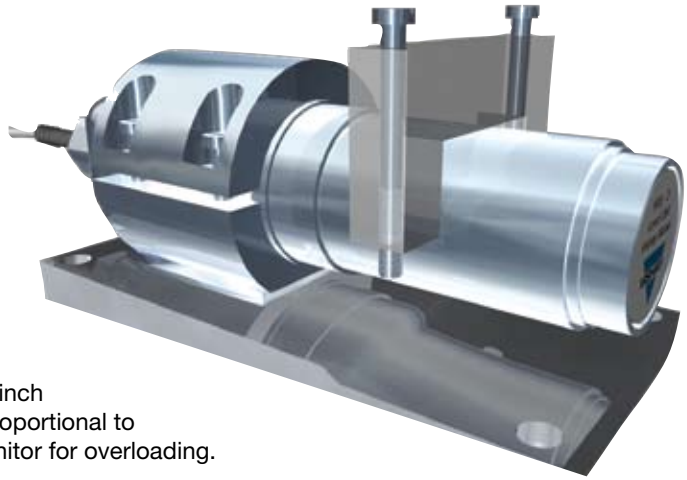
The Logical Choice

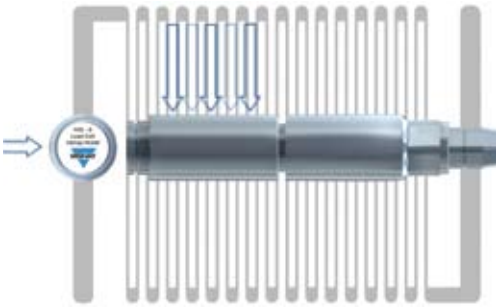
The KIS Load Cell

Simple To Install

Installation is very simple for a standard tank weighing application with KIS load cells. A load cell with a standard bracket for anchoring in the foundation, and a yoke for application of the load are placed under each support leg. No stay rods or other mechanical arrangements are required. Because the load cell arrangement has a low profile, the overall height of the tank is hardly affected.

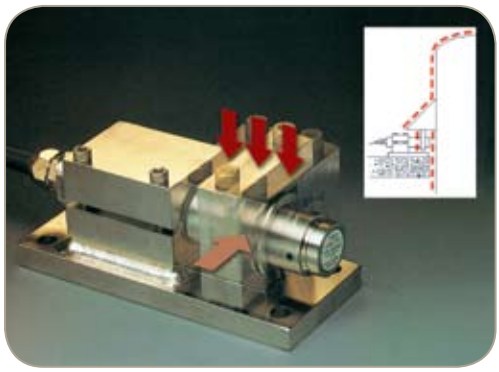


In more complex applications, where the load or force is not so well-defined, the cylindrical shape of the KIS beam can be used to great advantage. For instance, a KIS can be used to replace a deflecting shaft in a ship's winch gearbox, thus enabling the measurement of load that is proportional to the total load on the winch. This is an effective way to monitor for overloading.



Movable Load Point

With KIS load cells, the load point can be moved along the shaft without any detrimental effect on its high accuracy. This feature eliminates problems with load offsets due to thermal effects, or to the effects of vibration from agitators, for instance, when weighing reactors.



Withstand Very High Lateral Forces

When compared to other load cells, KIS load cells retain high accuracy even under the influence of lateral forces. This feature eliminates the necessity of stay-rod arrangements and makes them less costly to install.

Accurate And Rugged

KIS load cells are available with accuracy better than 0.02% of full-load capacity. Repeatability is better than 0.01%.

Most KIS load cells are constructed of stainless steel, and some models are yellow chromated steel. All KIS load cells are splash proof and meet IP67 requirements. A detailed data and calibration sheet is provided with every KIS beam.

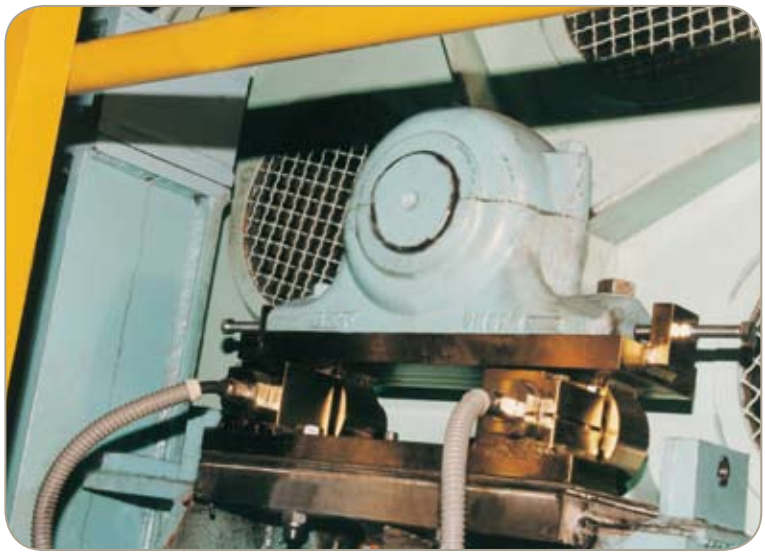
Approvals

All KIS load cells can be ATEX certified for use in explosive atmospheres. Some KIS models are also approved in accordance with OIML.

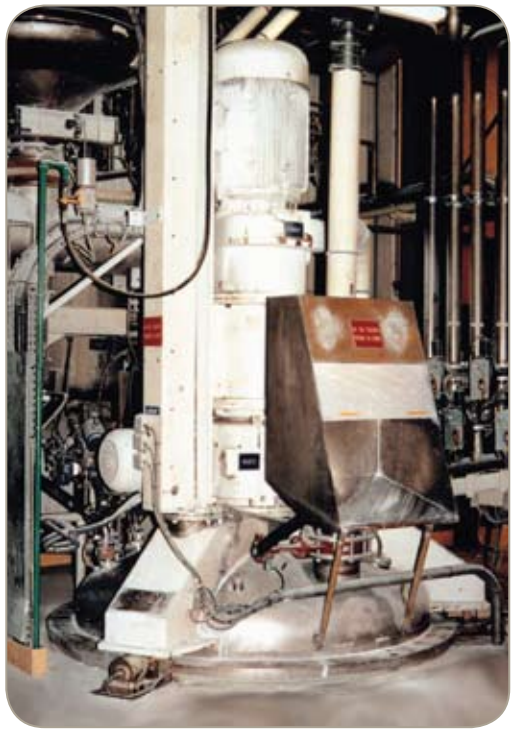
Applications

KIS Load Cells Deliver High Performance in All Types of Environments

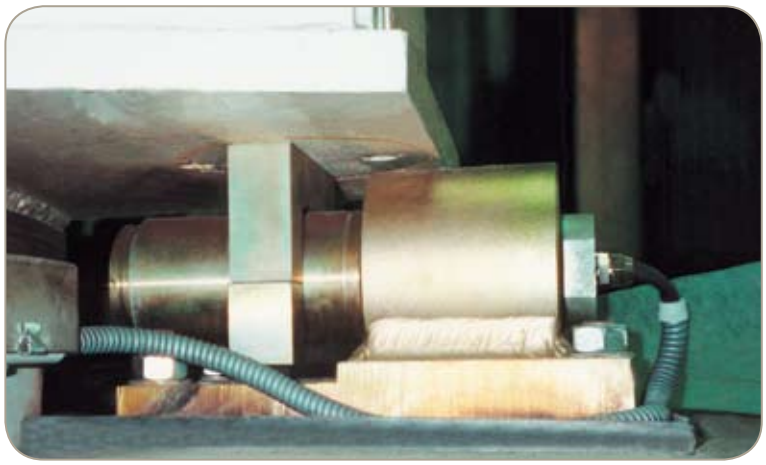
Suitable for a wide variety of applications, easy-to-install KIS load cells are extremely accurate, even when subjected to disturbing forces and severe environmental conditions.



In web tension measurement, the cylindrical shape means that the load cell can be rotated in its mounting so that it measures the resultant force.

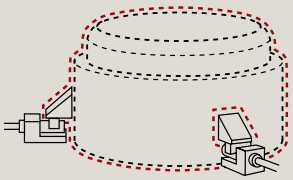


KIS load cells are immune to the vibrations that occur in reactor vessels with rotary stirrers.

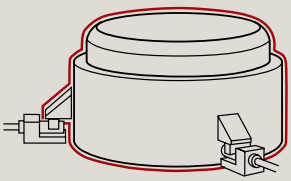


The low profile of the KIS transducer enables platforms to be constructed without changing the overall height.

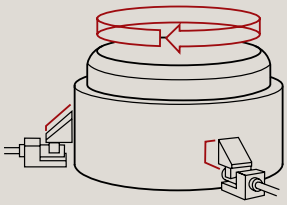
Tank suspended from KIS load cell.



Vibration from agitation



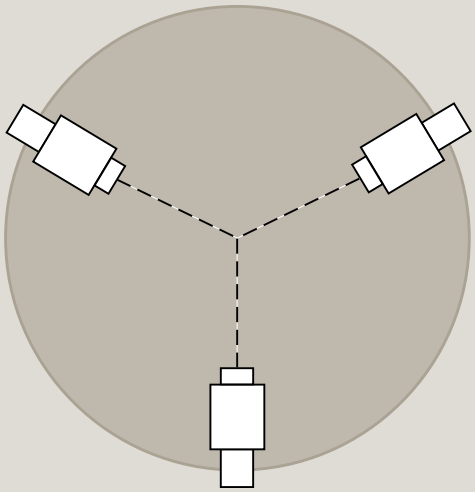
Thermal expansion



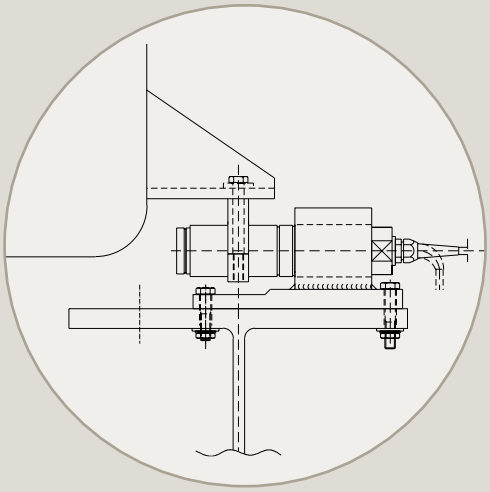
Twisting moment caused by agitator

Standard tank weighing.

Force measurement in materials testing.



Orienting the load cells towards the center gives a self-locking design that counteracts movement.



Unbeatable Features

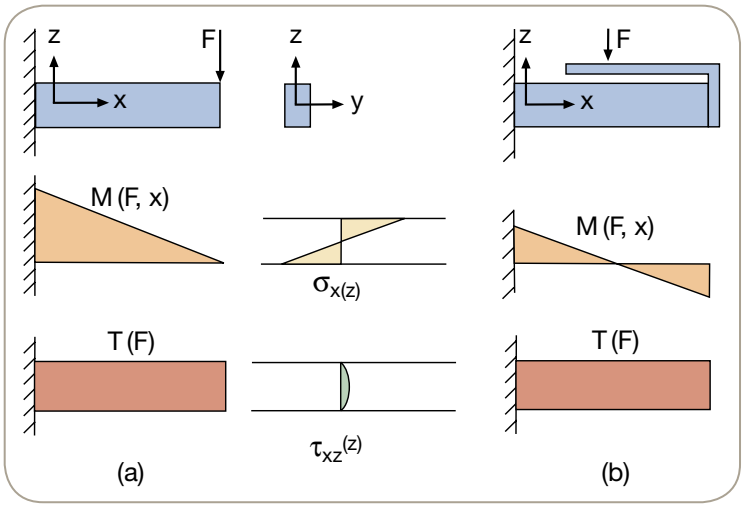
KIS transducers are shear beams; they measure the strains that arise from the shear forces caused by loading.

Because the KIS shear-beam transducer is inserted in a sleeve, the load can be applied directly over the strain gages, and the result is zero bending force and no effect on the result of the measurement (see diagram). The strain gages in the KIS beam are oriented for optimal measurement of the shear force.

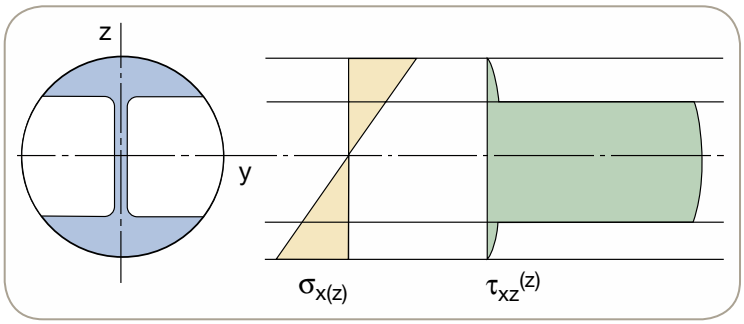
Even when the load point moves, the bending forces have no practical effect on the measurement result. The error is less than 0.005% of the output signal for every millimeter of movement.

The measurement body is an I-beam, which provides very rigid construction. This means that deflection is insignificant, and there is high lateral rigidity.

The combined result of I-beam construction with strain gages positioned in the web of the beam, means that KIS beams are virtually unaffected by forces such as torque and axial forces, which have a disturbing effect on other load cells.



Distribution of bending moment M, shear force T, normal stress σ and shear stress τ when the beam in example (a) is subjected to a force perpendicular to its free end, and (b) is fitted with an extra beam (for KIS a cylinder) along which the force is allowed to be moved.



Distribution of normal stress σ and shear stress τ in the I-beam under load. The shear stress is greatest when the normal stress is zero. However, there is very little variation in the shear force in the web of the beam.

Mounting

The standard KIS mounting is comprised of a bracket that is bolted to the foundation, and a yoke that surrounds the active part of the load cell. The yoke should be placed as close to the recommended load point as possible and tilt guards can be provided if required.

KIS beam mountings can be customized to fit a variety of installations. Where there is risk of the yoke sliding on the load cell, a distance sleeve and circlip are fitted to lock the yoke in place. In applications where the loading point moves frequently due to severe vibration, the recommended arrangement is to place the yoke on a ring surrounding the load cell. Teflon-coated rings are available for the lower measuring ranges.

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