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2 2010

Weighing technology news

Photo: Serac

The revolution in food engineering

— Aseptic load cells:
Certified to strict EHEDG standards

— Digital weighing technology:
Digital intelligence offers more

HBM

Editorial

HBM: Your strong partner in weighing technology

Gerhard Kadijk,
Head of Product Management
Weighing Technology and OEM
Sensors

Worldwide at your side

Dear Reader,

Competitive standard products and innovative high-end solutions - the weighing technology product range offered by HBM is unique. You profit twice as a customer: solutions perfectly tailored to your requirements combined with optimum quality.

HBM – a strong partner
The economy is once again on track. And, as the first months of this year shown, our customers have continued to choose HBM products with keen interest. This confirms that together we are strong partners: for classic, weighing technology applications and in new, innovative business areas.

Optimized price/performance ratio
The right strategy creates success in times of hard competitiveness. And quality is central to HBM's strategy. HBM products have now represented safety and reliability for 60 years – and this is thanks to a global production strategy at competitive prices. This also includes the latest innovation from HBM - the aseptic load cell PW27, which has been developed from an hygienic design perspective.

Customer satisfaction through customer closeness
The close cooperation between our sales force and the specialists at our headquarters means real profit for our customers. Direct access to our metrological experience and competence can deliver the decisive impulse for the successful realization of new ideas. We also continue to provide advice after a project has been implemented as long-term customer relationships are very important to us.

It is our aim to discover economic and technically high-quality solutions - together with you. Because your success is also our success.

Gerhard Kadijk

In this issue

"My favorite product is the HBM 'classic': the Z6 load cell. It combines excellent specifications and competitive prices. Often imitated, but never equaled by the competition, it is a real success product at HBM with growing turnover."

Timo Ren,
International Product Manager
HBM China

"My favorite is the FIT load cell family. It is a door opener for new weighing technology applications such as filling, dosing and checking with extremely high precision and high measuring speeds, and can now be economically implemented. These weighing electronics are very precise, compact and reasonably priced products.

My customers choose HBM products because of their impressive quality, precision and reliability. HBM's customer closeness and competent support are also seen as real added value."

Bob Chevalier,
Sales USA

"My customers appreciate the combination of a globally active company with competent and easily accessible technical support provided by HBM.

I have two favorite product lines - PW15 and RTN.

The PW15 load cell is ideal for numerous applications in standard business. With identical mechanical dimensions, it is even available as an IP69K-protected or digital version.

The user-friendly RTN ring-torsion load cell is perfect for demanding projects thanks to the compact design, temperature options and excellent accuracy."

Bernard Vindret,
Sales France

"My favorite products are the system solutions consisting of load cells and digital electronics in a very compact housing. This digital measurement chain is a very inexpensive, effective solution.

My customers appreciate the efficient cooperation of their engineers with HBM specialists. HBM helps to find optimal solutions and supports the customer during subsequent commissioning."

Hermann Merz,
Sales Germany

Choose HBM weighing technology! Get in touch with us. All contact information can be found on the Internet at **www.hbm.com/weighing**

Weighing technology at work

Imprint

Publisher
HBM GmbH

Im Tiefen See 45
D-64293 Darmstadt,
Germany

Email: info@hbm.com
www.hbm.com

Editorial management
HBM Marketing Communication

Responsible for editing
www.makomti.de

Design & Artwork
www.contrust-design.de

Top innovations | Food, pharmaceutical and biotechnology industries

Hygienic system design with EHEDG-certified PW27 load cell

Hygiene is obligatory for foods and medicines, and applies from the start of design and development of production and filling systems. Efficient construction and the use of appropriate materials prevents deposits and simplifies cleaning. These requirements are met by the new PW27 hygienic load cell from HBM and confirmed by the official EHEDG certificate.

Safe, clean food and medicines are the goals of aseptic production and packaging. Hygienically designed, easy-to-clean systems prevent cross-contamination, i.e. contamination with materials from previous production runs. The food, pharmaceutical and biotechnology industries all manufacture according to established guidelines such as GMP (Good Manufacturing Practice) and other current standards. Organizations such as the FDA (Food and Drug Administration) or the EFSA (European Food Safety Authority) ensure compliance.

Hygiene begins during design

The EHEDG (European Hygienic Engineering and Design Group) has published its guidelines for hygienically designed machines, equipment and components. Hygienic design is particularly important at points where contamination of the product is possible. Bacteria favor rough surfaces, they need water and nutrients to reproduce. This means that smooth surfaces and easily accessible components that are easy to clean will hinder bacterial contamination.

Hygienic load cells

The PW27 load cell is EHEDG-certified and therefore suitable for use in weighing systems in the food, pharmaceutical and biotechnology industries.

PW27 in overview

- EHEDG-certified
- Hermetically sealed and IP68/IP69 protected
- Food-compatible stainless steel
- Indestructible with integrated overload protection
- Perfect for multi-head combination weighers and static scales

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Overview of an hygienic system's requirements

- Easy and comprehensive cleaning
- Materials with high corrosion resistance
- Smooth surfaces
- No pores, cracks, fissures
- Flow-efficient geometries

Photo: Serac

Photo: SIG

PW27 and PW25 aseptic load cells

Top innovations

Shorter cleaning times, higher product quality with the new aseptic load cells

Reduced cleaning times means less system downtime giving real increases in production efficiency. The PW25 and PW27 load cells make significant productivity increases possible in aseptic systems.

The requirements for automatic weighing and packaging systems, and filling/dosing systems, are increasing – ever increasing demands are being placed on the hygienic and aseptic properties of components and system elements.

Productivity winner

Product quality increases with product purity. Hygiene is a competitive factor as faster cleaning reduces downtime. Current laws, guidelines and quality specifications are also also increasing awareness of hygiene standards.

This is where HBM comes into play with its PW25 and PW27 load cells that have been specially developed for aseptic and hygienic applications.

Load cells are basic elements for weighing, dosing and filling processes. Modern weighing technology can be easily included in aseptic or hygienic production processes with the PW25 and PW27 load cells.

360° protection

Both load cell types are the first in the 10 and 20 kg range, are IP68 or IP68K protected and have an integrated, encapsulated overload protection in the measuring body. The surfaces and quality of the materials used are permitted for use in sensitive areas. The hermetically encapsulated load cells can be cleaned with high pressure steam jet cleaners or chemical media, and they can also be used in CIP systems (Cleaning-In-Place).

Aseptic in standard dimensions

The PW25 meets industrial standards and can be integrated in existing systems at reasonable cost. The PW27, which is additionally tested and certified to EHEDG, is impressive with its extremely high hygienic and aseptic properties, even the cable and the screwed connection permit utilization in the aseptic section of a system.

Eckhard Akkermann, HBM

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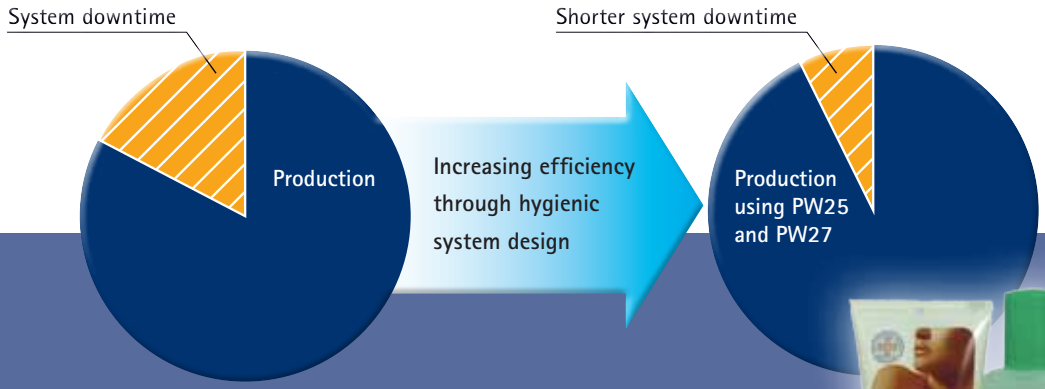


Use of aseptic production systems:

- ___ Food industry
- ___ Animal feed industry
- ___ Cosmetics industry
- ___ Biotechnology
- ___ Chemical industry
- ___ Paint industry

Aseptic weighing

Hygiene: A human topic

Contaminated food rapidly becomes a deadly danger. Right from the start, humanity has worried about "food hygiene" - even though this term was only heard for the first time in the 19th century. Here's a brief history of food hygiene.

Hygiene is derived from the Greek word "hygienos"- healthy and beneficial. Thousands of years ago humans were already considering how to correctly store and handle foods so that they were available for consumption over long periods of time.

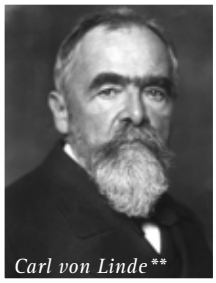
Hygiene - always essential for existence

In addition to techniques for preserving foods, laws and regulations were developed early on for handling foods. Numerous "food taboos" were known in ancient times. Jewish law prohibited the consumption of pork 1800 years before Christ. Regulations for food hygiene also existed in the Middle Ages. In 1202, King John in England passed the first ever food law.

Hygiene boom in the 19th century

The development of science and technology created the definition of "hygiene" as we use it today. With the start of the industrial revolution, food production became increasingly industrialized. The introduction of new processes to increase food preservation and reduce germs during production went hand in hand with this industrialization.

*Large-scale sterilization system from 1956**



*Carl von Linde***

*The cooling machine developed by C. Linde and F. Schipper***

- 1850 - British scientist John Tyndall developed the Tyndallization process for germ reduction in heat-sensitive foods
- 1855 - Friedrich Küchenmeister discovered the relationship between pork tapeworms in humans and the parasitic infection cysticercus cellulosas
- 1860 - Friedrich Albert Zenker proved the infectiveness of parasitic trichinae roundworms
- 1864 - French chemist Louis Pasteur invented the Pasteurization process
- 1895 - Carl von Linde developed a cooling process to preserve food.

Technical processes around food hygiene continued to be developed in the 20th and 21st centuries. Increasing numbers of regulations ensured more safety in the production of food. Starting from the "Food and Drugs Act" and the "Meat Inspection Act" passed by the US Congress in 1906 - all the way to the joint EU regulation for food hygiene 100 years later.

Food: Today safer than ever

Our food is now safer than ever before from contamination and pollution. This development has been made possible by increasingly stricter laws and technological developments.

HBM's new PW27 hygienic load cell follows this tradition: it enables the efficient and precise operation of food packaging and filling systems, multi-head weighers and static scales, and is in full compliance with the latest discoveries in hygiene research.

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* Photo: Hans-Günter Quaschinsky, Deutsches Bundesarchiv

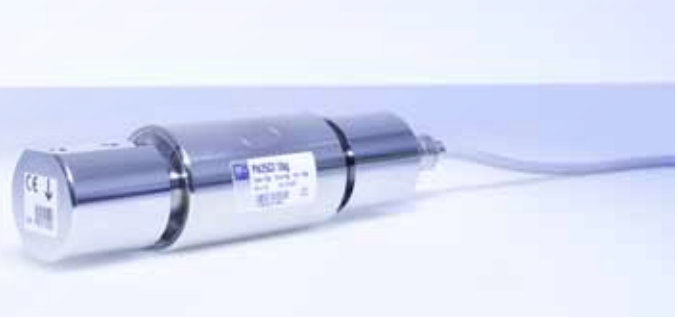
** Photos: Ullstein Bild (*C. Linde*: by Philipp Kester)

WORLD PREMIERE

Top innovations Load cells for the food and pharmaceutical industries

PW25 and PW27 – World innovations in overview

PW25



PW25 – The robust unit with integrated overload protection

The PW25 is a rugged and resistant platform load cell. Even humid and chemically aggressive environments cannot affect it. With a housing made of stainless steel, the PW25 can be easily cleaned and disinfected. The integrated overload protection makes it almost completely insensitive to physical influences. It is the perfect upgrade for installations complying with the industry-standard SP4 single point load cell.

Recommended for:

- Food industry
- Biotechnology
- Pharmaceutics

When hygiene counts:

- Filling and packaging machinery
- Static scales
- Multi-head combination weigher

The advantages

- Integrated, encapsulated overload stop
- Compatible with industry-standard SP4 load cell
- Stainless steel housing with IP68 / IP69K protection
- Maximum capacity 10 kg (22 lbs) and 20 kg (44 lbs)
- Easy to clean

PW27

PW27 – The aseptic unit with EHEDG certificate

The PW27 is easy to clean and fully compatible with cleaning and disinfectant media used in the food industry. Microorganisms don't stand a chance: the surfaces are too smooth for them to get a hold of. It's the perfect load cell for the food and pharmaceutical industries where contamination must not occur.

Bernd Knöll, HBM

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The advantages

- EHEDG-certified (European Hygienic Engineering & Design Group)
- Designed for optimum hygiene
- Aseptic design for max. safety
- Suitable for humid, aggressive environments
- Stainless steel housing with IP68 / IP69K protection
- Maximum capacity 10 kg (22 lbs) and 20 kg (44 lbs)
- Easy to clean

Weighing technology at work Optimally balanced temperature compensation

RTN load cells impress under extreme temperature conditions

-25 °C to +80 °C (-13 °F to +176 °F)

Strong temperature variations can have a detrimental effect on the measurement results of load cells. RTN load cells are uninfluenced by freezing or extremely hot conditions. Due to their optimized temperature compensation, they deliver reliable results. RTN load cells demonstrate their strengths even in the technically extremely demanding isotope enrichment process.

Isotope enrichment systems produce expensive products. This is why the produced quantities are precisely determined during the process procedure. An internationally common method of isotope separation is the gas centrifuge system. Isotopes in the introduced gas with different weights are mechanically separated in the centrifuges.

Extreme temperature capabilities

In the first production step, the transport container with the gaseous element to be separated is located in a heating chamber at up to +80 °C (+176 °F). Following a centrifuge cascade, the separated gases are cooled down in a cooling chamber to -25 °C (-13 °F). Identical load cells are used in both areas. Their precise location is unknown until they are installed.

RTN load cells adapted to the application case

Money saved by precision

The load cells are individually interchangeable to enable simple and cost-effective maintenance. This challenging requirement means that the load cell sets must remain within the required limits with regard to their total performance, in any combination.

Project requirements for the load cells:

- Recording of loads up to 15 t, with a resolution of 3 kg (6.6 lbs)
- Working temperature range -25 °C to +80 °C (-13 °F to +176 °F)
- Simple exchange of load cells in case of maintenance
- Random load cell combinations
- Hermetically sealed due to strict safety regulations
- Compact design

Rudolf Almendinger, HBM

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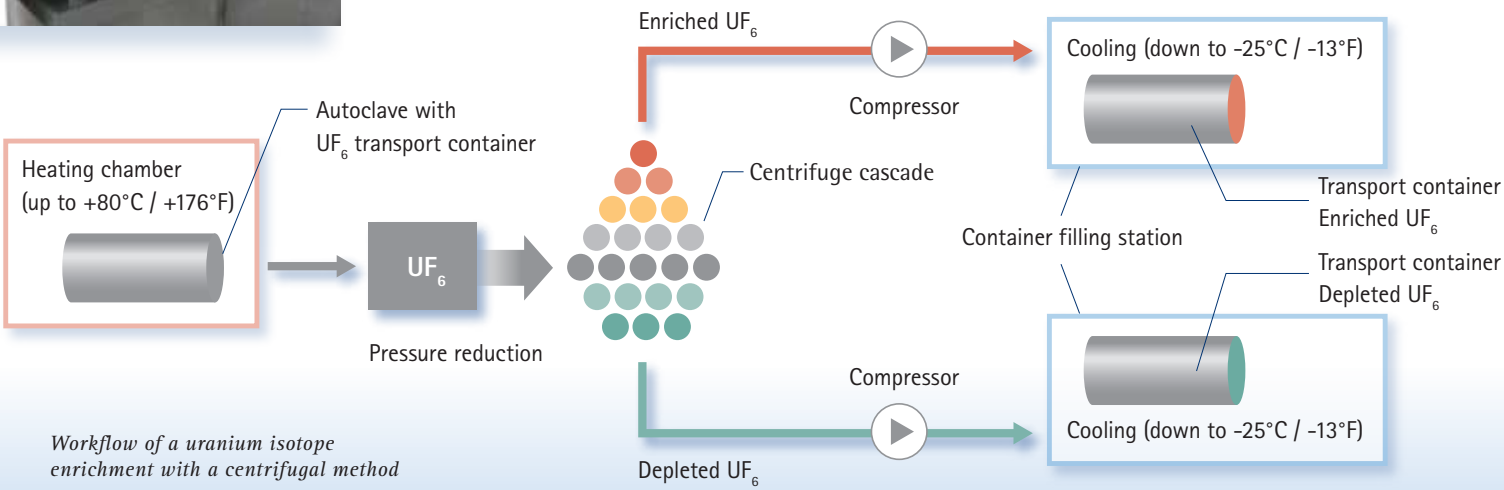

Workflow of a uranium isotope enrichment with a centrifugal method

Weighing technology at work Safety in automatic warehouses with VKIA405

Long-term stable solutions for weighing and monitoring tasks

Scales have numerous tasks in an automatic warehouse: they protect against overloading, help in selection and contribute towards safety. For active overload protection, all storage supports are weighed and evaluated by a connected electronic system before the warehouse is filled. Standard scales are too expensive for this application: it is better to use the VKIA405 digital amplifier.

The stability of an automatic warehouse requires that the weight is evenly and symmetrically distributed over the shelves and that the maximum bearing capacity of the high bays is not exceeded. A scale in the material flow monitors the weight and thereby protects personnel and the stored goods. This scale must be stable and maintenance free in operation because any readjustment of the scale means that the stock must be removed. Standard scales are not suitable for load monitoring in high bays as extreme long-term stability is required. HBM has specially developed the VKIA405 digital amplifier for these requirements. This allows a scale for storage spaces of between 200 kg (440 lbs) and 2000 kg (4400 lbs) to be set up with up to four SG load cells.

Equipped for power failures

All VKIA405 parameters can be stored safe from power failure in an internal EEPROM. The IP65-protected VKIA405 is suitable for simple weighing and monitoring tasks that lie outside the required legal-for-trade requirements.

Simple installation

The amplifier is supplied with a basic factory calibration which is adjusted to the application either via software commands or through actual adjustment using weights.

Fast, simple and precise

The off-center load errors are compensated for and the instrument is scaled during commissioning. Previously prepared resistor networks are available for the off-center load compensation and are activated by opening a wire bridge. Tolerances in the mechanical construction of the installation site generally lead to an off-center load error. The necessary off-center load compensation and adjustment during commissioning can be implemented rapidly in four simple steps:

1. Load the corners
2. Read the correction value from the diagram
3. Activate the balancing resistor
4. Place a defined load on the scale and accept the measured value via software

Computer connection

The VKIA405 can transmit the measured values via the RS485 two-wire interface to a superordinate computer. This enables computer-supported order selection and storage placement.

Reiner Schrod, HBM

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Digital weighing technology Manipulation-proof and MID-compliant

Secured by HBM

Using DWS2103 to obtain legal-for-trade weighing systems in PLC-controlled open systems

Goods worth millions are processed via automatic weighing instruments when unloading ships or filling bulk goods. To prevent manipulation and fraud, weighing instruments in goods traffic must be verified and protected as much as possible. The DWS2103 digital scale display forms a legal-for-trade unit, in combination with the AED solution for analog load cells or the FIT digital load cell. The unit is also compliant with WELMEC 7.2 data encryption requirements for enhanced security.

Secure data transmission

Automatic weighing instruments are often integrated in automated systems. The measuring process starts and stops automatically. These open systems can only be verified or protected against manipulation as a complete solution to a certain extent. The scale itself therefore has to be protected. Load cells and the DWS2103 exchange data with each other, encrypted with a modern "unbreakable" algorithm. A 256 bit key is used, in accordance with the Advanced Encryption Standard (AES) process. All scale data required for verification, together with date and time, are encrypted and also stored internally. Manipulation can thus be documented and traced at any time.

Cost-effective integration

The scale can be integrated into complex systems via simple software commands and allows standard software to be used. The AED electronics enables analog load cells to be connected to the digital DWS2103. HBM also offers a cost-effective option of achieving an approved weighing instrument without expensive documentation.

An approval* is available for the legal-for-trade chain comprising FIT/AED and DWS2103, which can be transferred at a low cost.

Future-proof

It is possible for the first time to transmit verified data wirelessly with the digital system. This enables facility and asset management via WLAN connection to superordinate control systems. In addition, WLAN communication can also be used for the spatial separation of the scale and display. This makes cable laying in rough environments superfluous. Several scales with a common display can be implemented as well as legal-for-trade weighing stations that are powered by solar or fuel cells. An ideal solution for areas with uncertain power supply or without mains access.

Reiner Schrod, HBM

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* PTB approval available soon

Digital weighing technology

PW15AHi – Digital intelligence offers more

Digital load cell in the PW15 family scores points in filling and checking applications

The new PW15AHi is a digital, intelligent enhancement of the previously analog PW15 load cell family. This load cell is specifically equipped for "filling and checking" tasks and is perfectly suited for intelligent checkweighers or multi-head combination weighers in filling and packaging systems.

Up to
1200
measurements / s
PW15AHi

Robust, cost-effective, precise

The new PW15AHi has a hermetically encapsulated stainless steel housing with IP68K protection. Both the mechanical dimensions and the electrical properties are identical to those of its analog sibling, the PW15AH. Integrated, completely digital signal processing has been added. The accuracy complies with OIML C3.

Filter for dynamic processes

Weighing in filling machines means rapidly selecting and evaluating the measurement signal from a very dynamic signal curve. The PW15AHi has taken the lead over the competition, particularly due to the internal digital filter. This was specially developed for use in multi-head combination scales, filling machines and checkweighers: The PW15AHi can carry out up to 1200 measurements per second.

Process optimization

Filling machines need a combination of rapid filling at the start of the process followed by a precision stop at the required filling weight: controlled coarse flow and fine flow are decisive to the process. The PW15AHi supports machines with a coarse/fine flow signal and thereby optimizes processes. If the filling machine is set up for a different packaging size, adaption to the new format is very easy with the integrated learning function. The load cell transmits its data via a field bus connection such as CANOpen, DeviceNet or via an RS485 interface to a superordinate PLC. The filter is parameterized and the learning function is activated in the reverse direction. The user saves time and money with the AED Panel software, provided free of charge, which includes the functions for set-up, parameterization and analysis of the load cell.

Freedom through flexibility

The weighing process is started by a trigger signal that comes, for example, from a light barrier. Both pre/post triggers are available, providing more flexibility in the set-up of the system.

Weighing cost-effectively in adverse environments

The PW15AHi is a part of the FIT digital load cell series and enhances this series through a cost-effective, IP68-protected, compact product. This results in a very good price/performance ratio for difficult operating conditions during filling, weighing and packaging.

■ *Bernd Knöll, HBM*

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TROPPER uses RTN load cells for highest levels of reliability

The Austrian company TROPPER uses HBM's weighing technology onboard its range of delivery and mixing vehicles to bring the precise quantities ordered to its customers.

TROPPER builds silo containers for bulk materials and its core strength lies in its individual transport and mixing vehicles fitted with onboard weighing. The integrated scale must be legal-for-trade, reliable, robust and durable.

Determining weight at any time and any place

Delivery tours are more economical in vehicles with onboard weighing as the precise quantity ordered can be loaded and delivered for each customer. Tropper's onboard weighing system is available with EU calibration class III and logs the relevant delivery data appropriately according to the quality assurance system.

The challenges

The scale is positioned below the vehicle's container framework. The load cells are subject to intense vibration and high impact during transport, in addition to other tough conditions such as weather and high-pressure cleaning, and must give accurate results consistently.

The solution

At the heart of the onboard scales are several HBM RTN C3 ring-torsion load cells. Josef Vogl, Tropper's manager for technology and vehicle initial verification, is extremely satisfied: "The HBM solution is extremely reliable, we have had zero failures over the past several years. In addition, the RTN is unbelievably precise. Together, these strengthen our market position as reliability gives us a a clear competitive advantage."

RTN ring-torsion load cell – Versatile by design

- The RTN uses very little current because the output resistance, at 4 kΩ, is very high-impedance, making it perfect for battery-operated mobile applications.
- The annular strain gages react to loads from all directions. The RTN also records loads that would be missed by a rod-shaped load cell.
- With 2.85 mV/V, the RTN has a very high output signal, and therefore a greater signal-to-noise ratio and very high accuracy.

Dietmar Pregartner, HBM

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