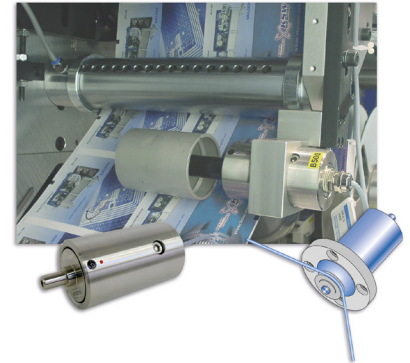
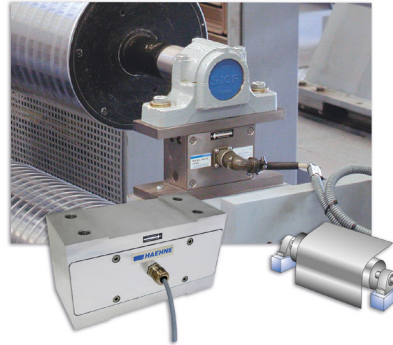
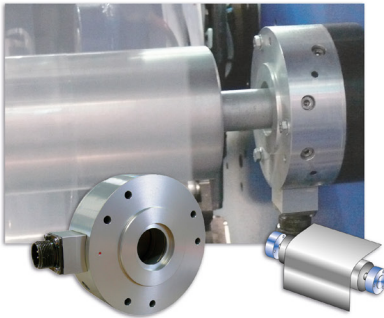
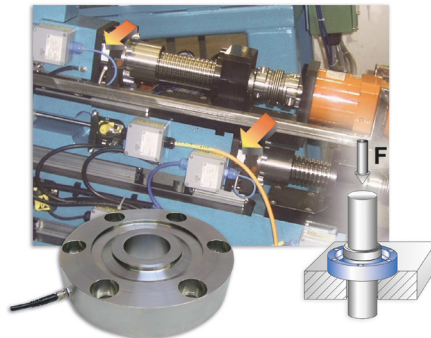
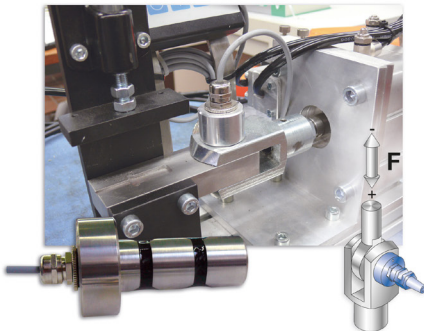




Web Tension Measurement



Force Measurement Technology



Evaluation

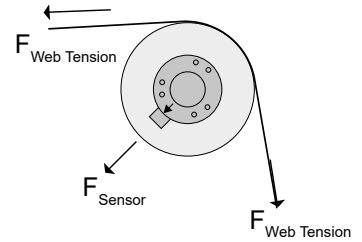


- Customized solutions
- Forces ranging from 10 N to 10 MN
- Over 40 years application experience

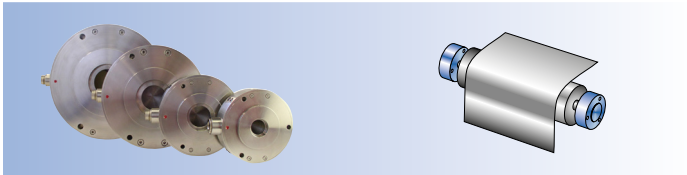


Web Tension Measurement

The measurement and control of running webs of material is necessary in processes with increasing process speeds and continuously increasing demands on product quality. Because the tension forces of those running webs cannot be measured directly, it is necessary to measure the forces acting on the bearings of idler rolls with a wide variety of force sensors. If properly designed the measured values are proportional to the web tension forces.



Radial Force Sensors



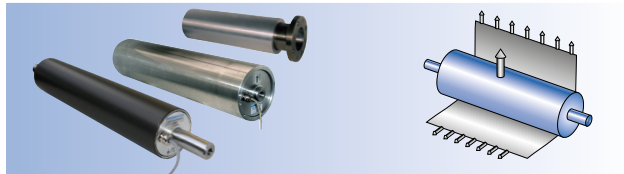
Pillow Block Load Cells



Narrow Web Tension Sensors

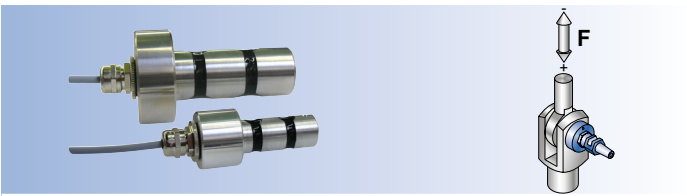


Measurement Rolls



Force Measurement Technology

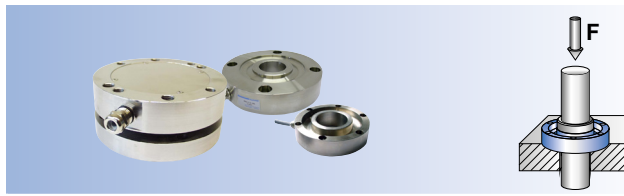
Force Measurement Bolts



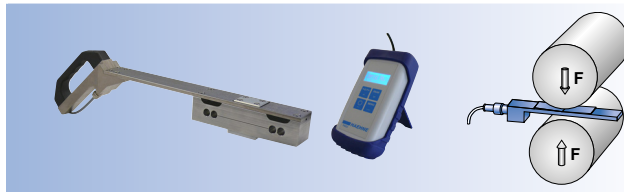
Compression Force Sensors



Ring Force Sensors



Portable Force Measurement Systems



Data Analysis And Closed-Loop Control

Strain Gauge Amplifiers with Analog Output Signals



Fieldbus Interface as Busbox
- designed for 1 to 8 Strain Gauge Sensors



Multifunctional Amplifier - Controller Moduls

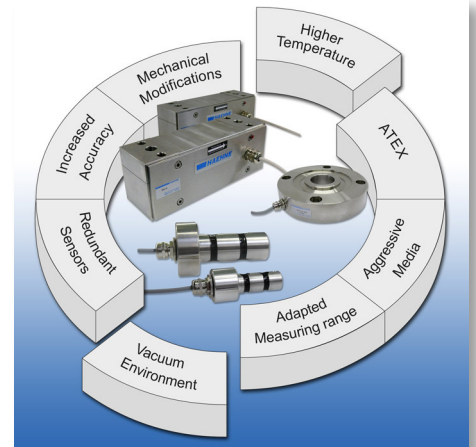


Interfaces



Additional Options For Special Tasks

Based on the long-term experience for special applications **HAEHNE** is your source for customized force measurement solutions. To meet the increasing requirements of measuring technology economically **HAEHNE** has developed a modular system for special options. The different options cover most of the customer specific requirements, such as:



- Support on the risk assessment issues related to the EC Machinery Directive



HAEHNE offers the following risk assessment service:

- Assessment of **HAEHNE** components for satisfying safety criteria
- Determining of possible performance levels up to stage d
- Design of sensors with redundant strain gauge circuitry on the request
- Cable break monitoring on the requests



Examples from the **HAEHNE** Product range:

- Pillow block sensor with redundant strain gauge bridges
- Measurement bolts according to the PL-gradation d and to EN ISO 13849-1

Redundant versions	D1	1 outlet
	D2	2 outlet



- ATEX certification



For sensors in potentially explosive environments

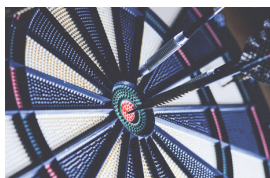
- Chem-Coater
- Aluminium rolling mill
- Enamelling line
- Chemical industry



II 2 G Ex ia IIC T6...T1 Gb

Ex-Proof	F	For use in potentially explosive environment
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- Increased accuracy

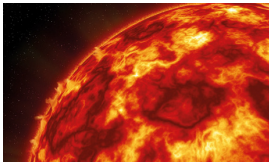


For some applications, the forces must be measured more precisely. Therefore, **HAEHNE** offers options with a higher accuracy. In the case of extremely high requirements, individual measurement ranges can be amplified separately through the spreading of the measurement ranges.

Increased accuracy	G1	0,3 %
	G2	0,2 %
	G3	0,1 %

Additional Options For Special Tasks

• Exceptional temperatures



In certain applications reliable force measurement may be necessary under elevated temperature conditions. *HAEHNE* sensors are available for operation in ambient temperatures ranging from -40 up to 300 °C (572 °F), higher temperature ranges may be available on request.

Temperature range	H1	to +120° C
	H2	to +200° C
	H3	to +250° C
	H4	to +300° C
	M1	to - 20° C
	M2	to -40° C

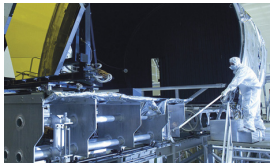
• Wet and aggressive environments



Special production processes may require the use of aggressive media. At the same time the measurement of forces and web tensions may be required in such environments. Based on extensive experience *HAEHNE* can provide “watertight solutions” for almost any industrial environment.

Protection class	Q	IP 67
	Q1	for oils / grease
	Q2	für acids / alcalis

• Vacuum applications

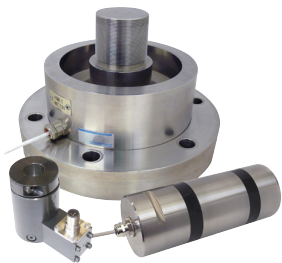


The design and production of sensors operating in a vacuum environment follow a special operational procedure. The components and materials used comply with the special degassing criteria.

Vacuum	V	High vacuum to 10 ⁻⁷ mbar
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Tailor-Made Sensors

• Mechanical adjustments according to customer specifications



Standard sensors are not always suitable for certain force measurement applications or for use in existing machine and equipment designs. *HAEHNE* can flexibly adapt to such requirements

- Adaptation of dimensions
- Measuring Machine Elements (MME)
- Customer special purpose solutions
- Enhanced design and engineering support

Special dimensions	X	according to customer's requirements
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Your Flexible Partner For Force Measurement Technology

• Options - ordering system, eg changed measuring range

ZAK-A-4000-KTX	
Type	
Design	
Nominal force	
Variants / Options	

Flexibly adaption of force ranges to the customers requirements

Modified nominal force	K	The nominal force is indicated in the order code
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• Modified cable connection

ZAK-A200-TW10	
Type	
Design	
Nominal force	
Variants / Options	

Different cable for special requirements	Y1	PVC
	Y2	PUR
	Y4	Teflon
	Y5	PUR, UL certified and drag chain-compatible
	Y6	Ölflex
Metal protection hose for „Heavy Duty“ requirements	U1	Metal spiral protection hose
	U2	Metal braided protection hose
Modified cable length	W	Please state cable length