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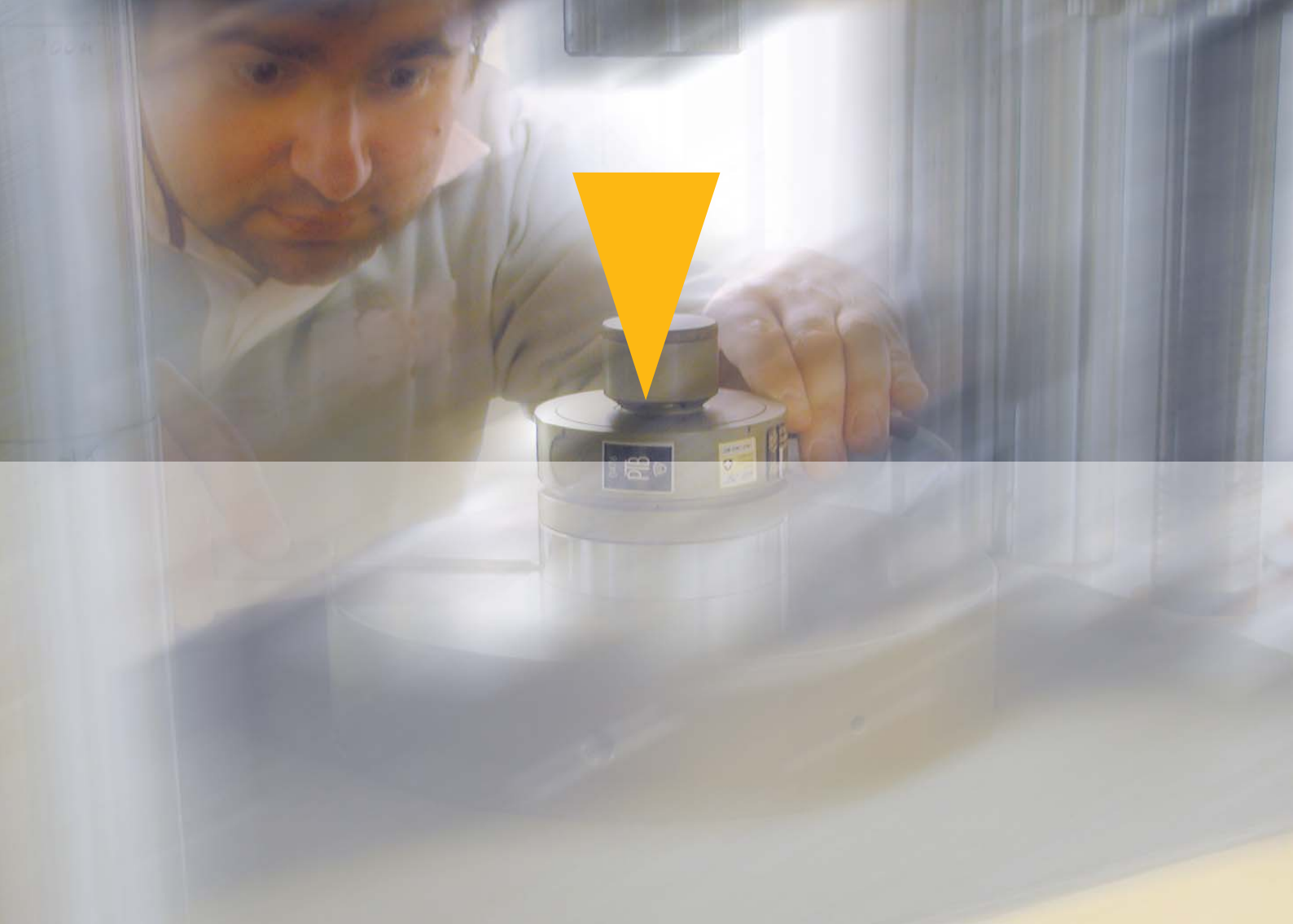
INSTRUMENTATION DEVICES SRL



DEFINING PRECISION

Be a Measure of
Forces and Moments





Limits

Exhausting potentials and surmounting limits are the essential goals we set. If you want to be the first you have to extend the limits consistently. This is the only way for potentials to match increasing requirements and to be converted into performance. We see ourselves as a highly motivated team which consistently redefines limits – in the company, the team and above all in our specialist field – our market. We exceed limits, because beyond traditional ideas we work on new solutions.

Capabilities

The capacities of our team are pre-determined by the constantly developing goals defined by the market. As a world-wide trend-setting company for the measurement of forces and moments we have employees who think and act in ways that are both constructive in concept and critical in communication. Knowledge belongs to everyone. Everyone bears responsibility and everyone is qualified to lead projects. Three authorities govern project work: cooperation, learning ability (learning aptitude) and problem solving.

Development of load cells 0.12 to 60 t, force laboratory Siemens

2 patents

1989

4 patents

1991

5 patents

1993

9 patents

1995

12 patents

1996

13 patents

1997

14 patents

First supplier of the German Industry of testing machines

1988

5 customers

First force measuring machine with strain controlled elastic hinges

1990

110 customers

1992

450 customers

1994

780 customers

1996

First supplier world-wide for force standard machines

In 2 countries Primary standard of force

Milestones

Intense

The GTM team of competent experts in design, evaluation, measurement and control techniques offers solutions for special, high and specific requirements. We replace established thought patterns as well as obsolete structures and approach problems creatively without any inhibitions. Thus standard products, standardised methods and individual projects are created in our company. Each of our solutions sets new standards, and even if we offer standards, their level clearly goes beyond the average.

Your individual tasks, conditions and requirements are no limitation for us but rather inspiration and incentive to perform. If you are looking for the ideal partner for precise and reliable measurement of forces and moments come to the leading address in this sector – not just to the next best – ask us.

Status

With our all-round mechatronic competence in all areas of the measurement of mechanical sizes, we – as the world-wide market leaders – set the standard for the measurement of forces and moments. In multi-component measuring techniques we are considered as the pioneer and the precursor. We are the leading supplier of calibration services for force, moment and multi-component sensors in Europe.

Chronicle

Our leading position is the result of an evolutionary process. We have always conformed to the high aspiration of being pathfinders by means of developments and patents, which have dramatically changed the world of force measurement.

Mission

Working on measuring forces and moments in terms of what they actually are – vectors - we continue to increase our competitive edge. We will be continually extending the limits of the measuring range and accuracy. And we are expanding GTM's world-wide presence with products, consultancy, training and engineering services.



97 Scales for hydrodynamic testfield PTB 30,000 kg weight to exactly 1 kg 2003 Leading supplier for force measuring technique for automotives
16 patents 17 patents 18 patents 19 patents 22 patents 23 patents 25 patents 27 patents 29 patents
Beam waveguide measured data acquisition for any number of measuring stations Biggest torque measuring machine in the world
1210 customers 1710 customers 2140 customers 3250 customers
1998 2000 2002 2004 2006
6 component platforms for precise multi-component measurements
In more than 40 countries Primary standard of force



» From the project planning stage, the design to manufacturing, assembly and commissioning of our projects Force Standard Machines 1 MN·m torque and 2 MN force the GTM engineers were reliable, creative and stimulating partners who have performed the agreed services in a technically correct manner and on schedule.

Dr. Ing. Diedert Peschel (Federal Physical Technical Institute, Brunswick)



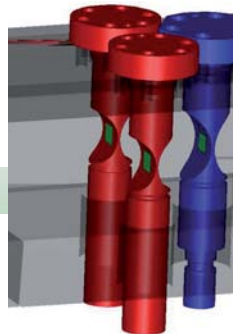
Primarily global

Less than 1/10th of the width of a hair on one meter – this is the level of accuracy to which we define forces and moments. And because we can do this so precisely, we have orders from all over the world. From the pyramids of Giza to Sugarloaf Mountain in Rio. In more than 40 countries on five continents GTM primary standards are determining the scales for forces and moments.

But limits are there to be surmounted, and borders to be crossed.



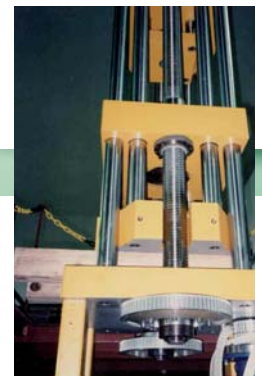
Largest of the world: 1,1 MN·m TSM



The breakthrough:
Strain controlled elastic hinges (DKG)



Modern force multiplication:
Build-up $9 \cdot 600 \text{ kN} = 5.400 \text{ kN}$



Lever 1:10 with DKG

Forces and Moments

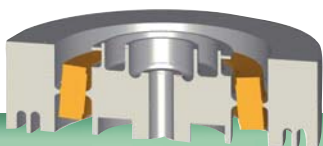
Mechanical interface: Central screw thread or hole circle, any diameters, pitches and drillings – the UBV product line allows you to have the mechanical interface always under control. The capturing and processing of measured data is facilitated due to measuring amplifier cards of the highest accuracy of up to 10 ppm and software for measurement and rapid control.

Overqualified?

K-series sensors are in fact over-qualified with their measurement accuracy of 0.02% related to the final value. But this is no problem for us and, above all, our customers. Another quite significant feature results from this: the large measuring range of 500 : 1, measuring the respective force to accurately 1% is even up to 0.002% of the final value: Thus the K-series is the unchallenged leader.

» *Due to the GTM product range from 0.2 to 10,000 kN and an outstandingly good measurement performance together with reliable just-in-time deliveries GTM is the premium supplier.*

Zwick GmbH



K-series: the extreme precise one



UBV series: the extreme flexible one



Torque high precision



Torque robust



Multi-Components

The GTM multi-component analyzer (MCA) combines the whole world of multi-component measuring in one unified piece of software, i.e. the transformation of measured forces and moments into hexapods or screws, into vectors or Cartesian components, coordinate movements or rotations. All to single click. Finally, an optimal relationship should be the controlling factor between the six components of a force and moment system.

For example, the German Federal Railways became one of our customers due to our excellent know-how in this sector. The aim of this project was the determination of the forces to which the buffers of wagons are subjected. GTM constructed a three-component sensor for axial forces up to 2,000 kN and transverse forces up to 150 kN for the Railway's Experimental Institute. The strains on the wagon buffers could thus be determined and these findings enabled the railway engineers to optimise the buffers and their working life.

» *GTM has brought our test rig up to state-of-the art in measurement techniques with its wheel load sensors.*

Roland Bösl, ZF Passau

Measure vectors:



Trailer coupling



Wagon buffer



Chassis



Force – Torque



Calibration

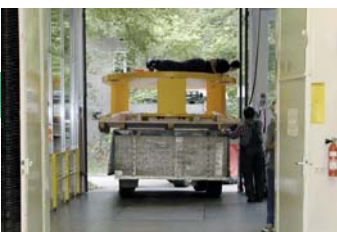
“Can Do” Attitude

Calibration is better than studying – we offer calibration services with forces between 0.05 and 2,000 kN and moments from 0.02 up to 5,000 Nm. We can also analyse force and moment measuring systems on-site in all directions and values up to 10 MN or 400,000 Nm.

You can expect creativity and enthusiasm of the GTM team both in the technical range as well as regarding other problems and challenges which concern the professional execution of an order. We deliver on a turnkey basis even under difficult transporting and assembly conditions.

Based on this philosophy we have successfully constructed machines according to specific requirements and restrictions, which have arisen from transport routes and mounting places. Once the delivery route was only usable until a few meters before reaching the destination – so our project leader quickly decided to hire the services of a local farmer to take the machine to its destination with his tractor. Necessity is the mother of invention – as the saying goes!

The only limits in the technical field for us are the physical basic principles. If you should have quite specialised measurement requirements, the GTM engineers will create a sensor precisely to your requirements.



» We are happy to use GTM's DKD (German Calibration Service) accredited calibration laboratory with its well-trained staff, as we can rely on a short turn-round and reliable calibration service, in which deadlines are respected.

Continental AG



DEFINING PRECISION

Outlook

As the pioneers in the field of measurement of forces and moments, we will also in future continue to make the most advanced technology in a timely and smooth manner available to our customers all over the world.



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