Torque Monitoring System with temperature detection

TelMAX

for system applications

*Patent pending

Application potential:

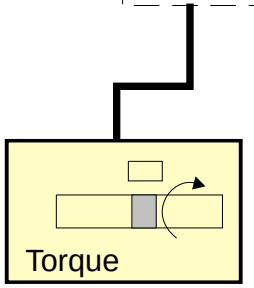
- Cost-effective, dynamic torque detection/monitoring on aggregates (gearboxes, motors, generators, etc.) in the context of Industry 4.0 without bonding and soldering process

- Innovative system concept for large distances between rotor and stator > 10 mm

- Suitable for new designs and integration into existing designs (retro-fit)

- Low axial space requirement for sensor cell < 18.1 mm

TelMA-Torque Element



Industry 4.0

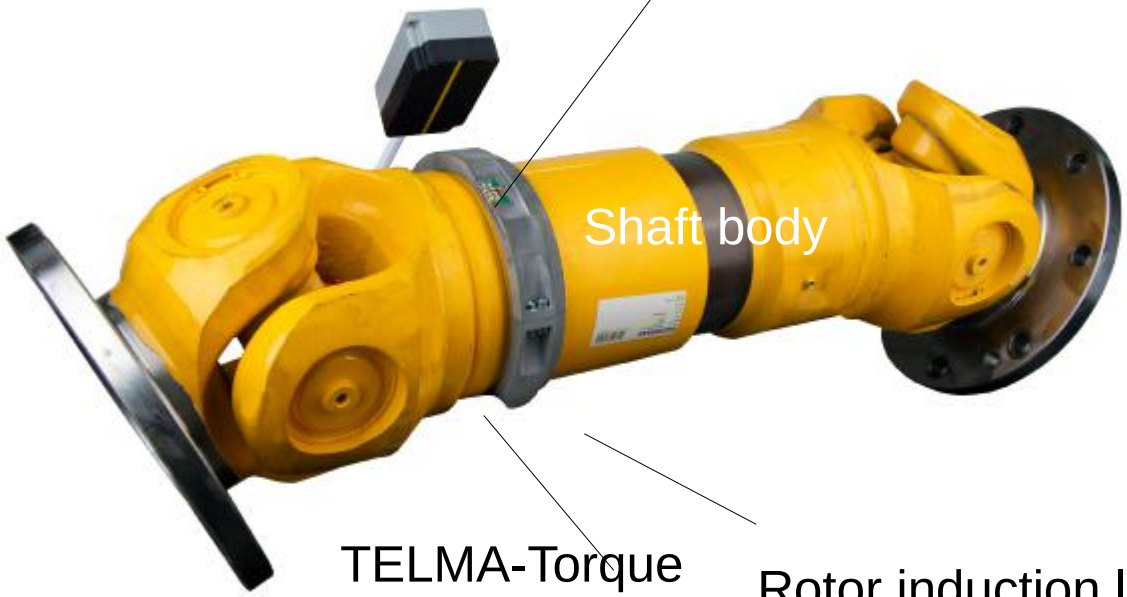
Features

- Torque detection by telemetric torsion sensor (TelMAX-Torque) (dynamic acquisition of torque by means of strain gauge technology on rotating shaft)
- Additional temperature detection at each sensor element
- Shaft diameter 30..1000 mm through configurable rotor ring carrier
- Compact stator pick-up, large distance rotor - stator > 10 mm (ideal for cardan shaft applications)
- Compact TelMA torque element with integrated sensor and telemetry interface
- Easy assembly without affecting shaft strength in series using micro-welding technique
- No error-prone gluing or soldering and no wiring necessary
- Compensation of bending moment influence by mounting 2 elements
- High accuracy and measuring signal resolution
- Analogue or digital torque signal output
- Integrated speed measurement
- Digital, contactless signal transmission
- Maintenance-free operation

Principal structure(1)

Evaluation unit

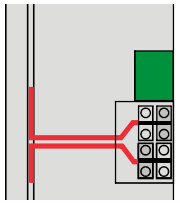
TELMA-Torque
Element Nr. 1



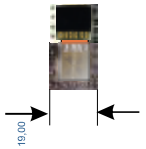
TELMA-Torque
Element Nr. 2

Rotor induction loop

Principal structure (2)

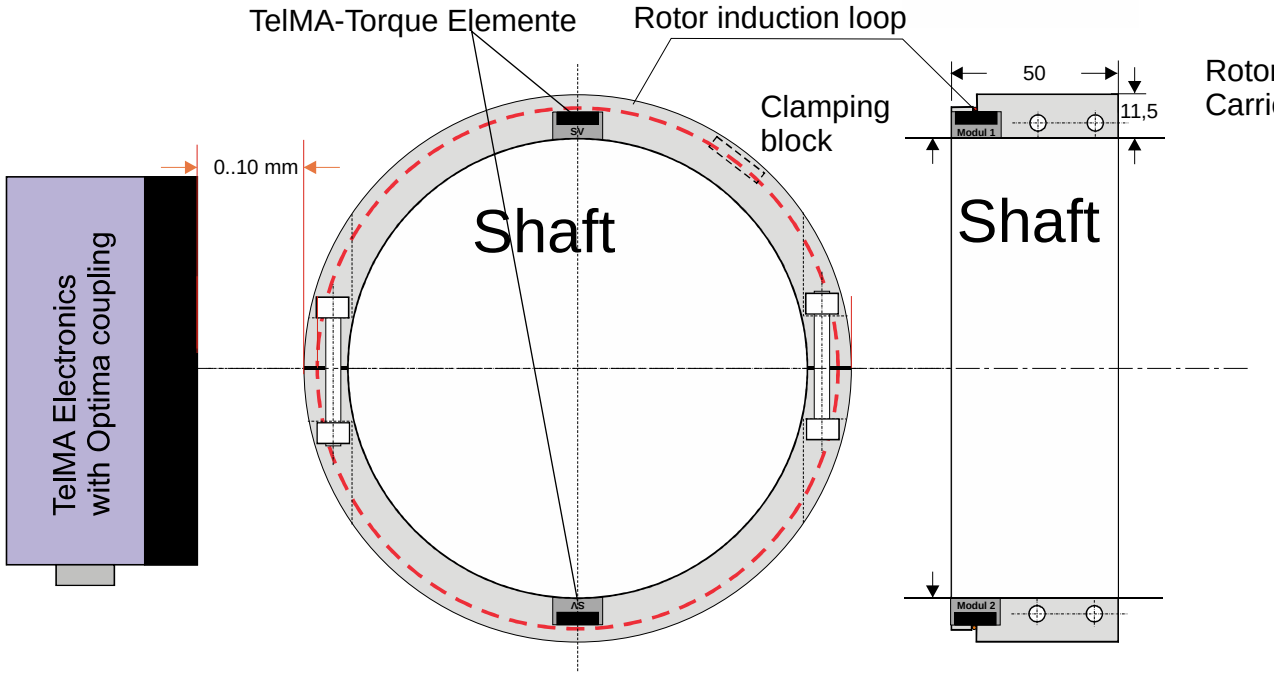


Clamping block

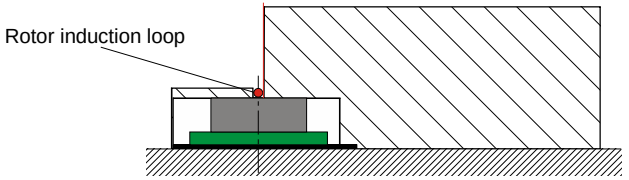


Axial space requirement
18,1 mm

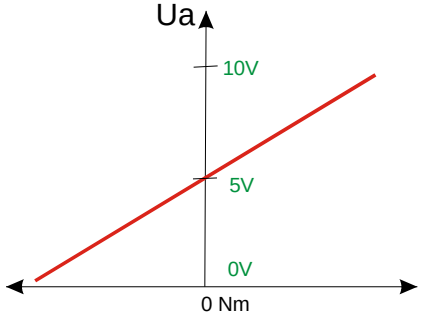
mounted



Section:
divisible rotor antenna



TelMA-Torque Element



Torque
(torsional stress)

Assembly sequence:

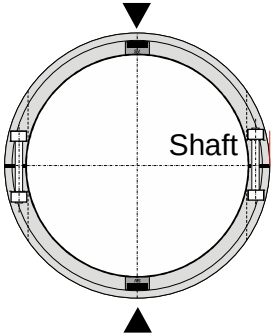
1. mounting TelMA torque elements on shaft

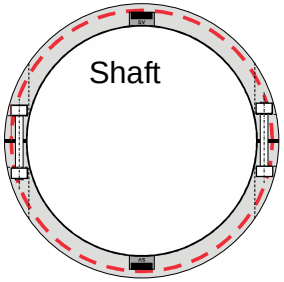
2. assembly of rotor support ring

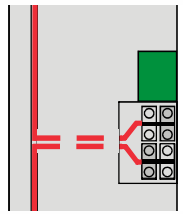
3. insertion of rotor induction loop
   and connecting with terminal block

4. mounting Pick UP (stator)

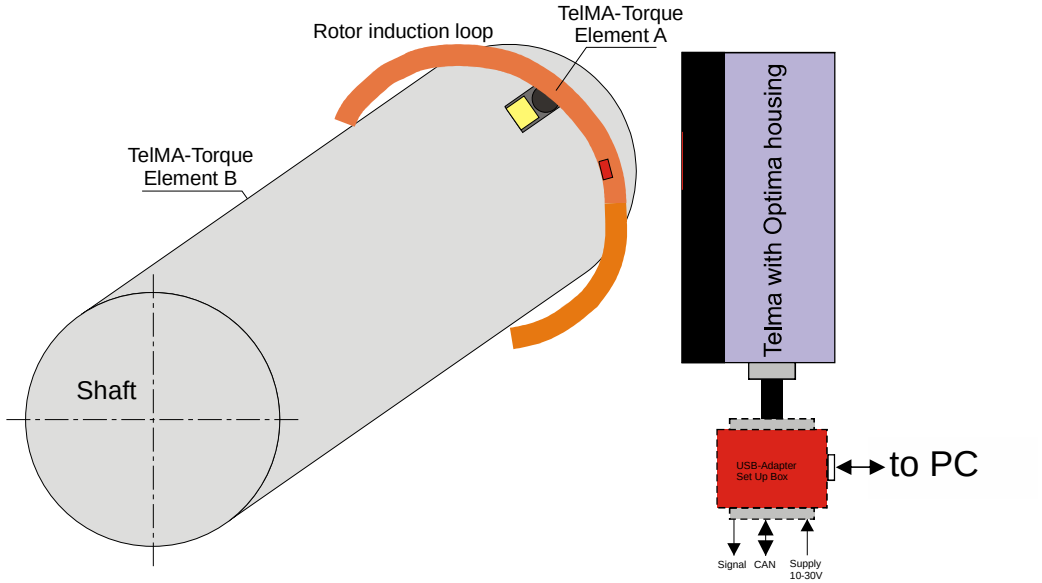
5. finished

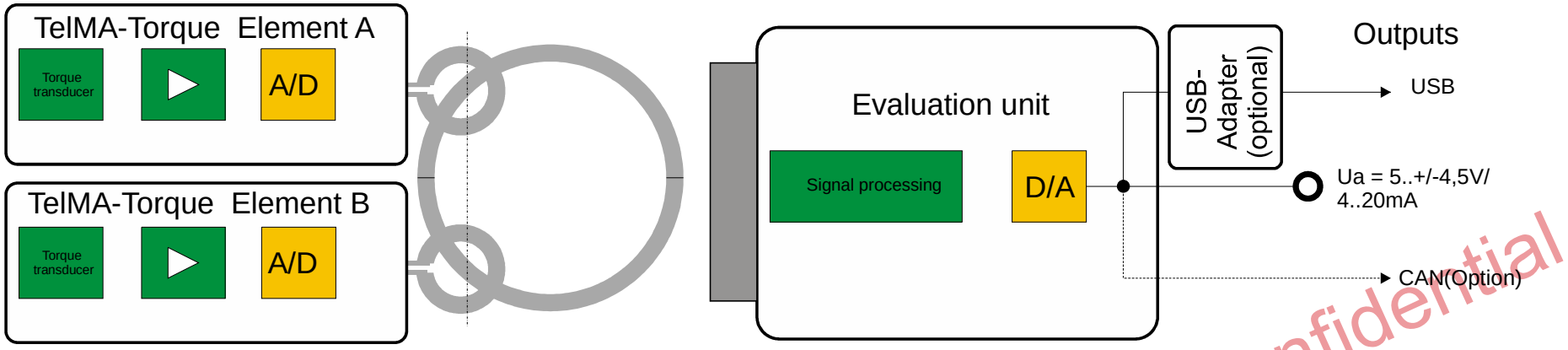




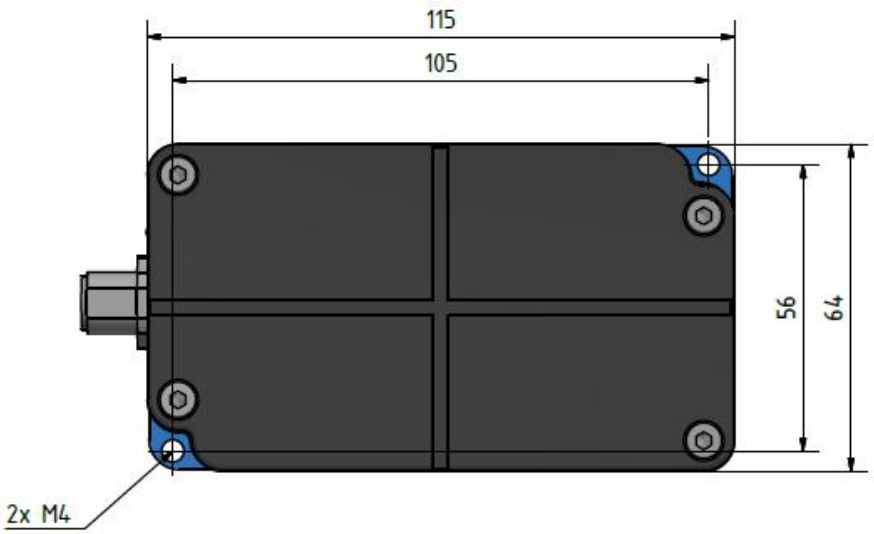


Electrical construction

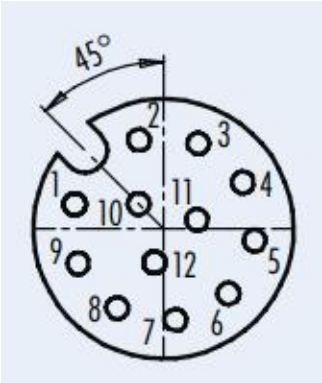




Stator unit (Industrial Version, IP67)

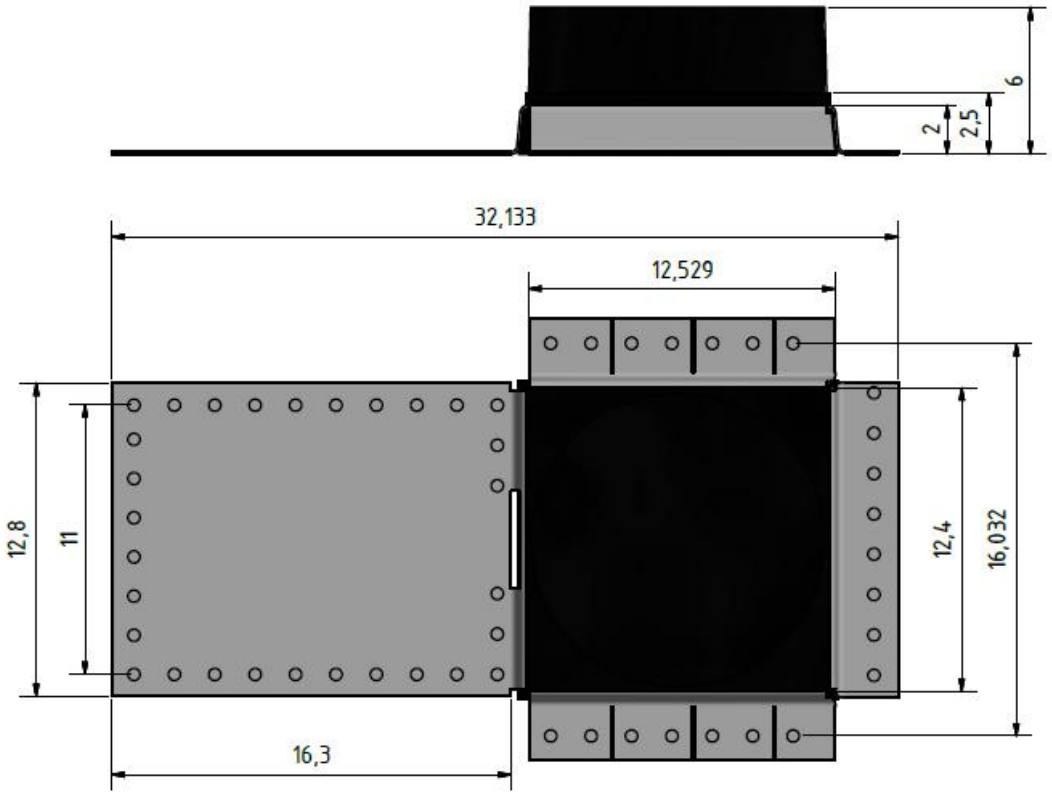


Pin	
1	Analogue Out 2,5 +2,5 V/ Analogue Out 4..20 mA
2	Analogue GND
3	KAL Signal
4	AutoZero
5	Power Supply GND
6	RPM (optional)
7	Power Supply 10-30VDC
8	TX/RX GND
9	TX out
10	RX In
11	CANL (optional)
12	CANH (optional)



TelMA-Torque Element

Dimensions:



- flexible carrier
- integrated sensor element
- integrated telemetry interface
- battery-free
- maintenance-free

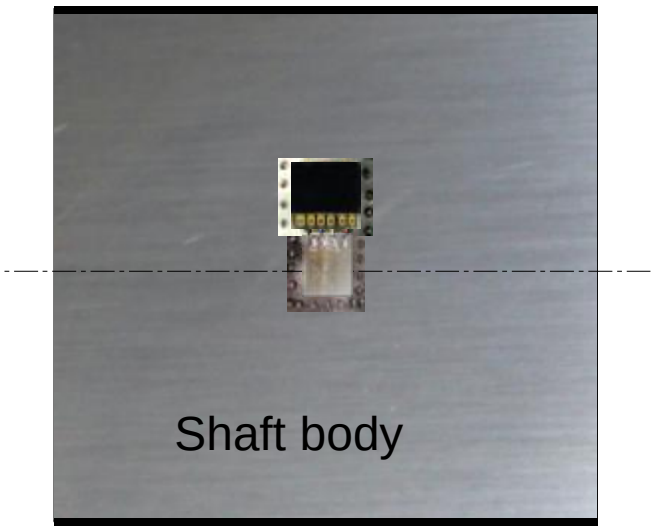
Variant A
(TelMA Torque with external sensor, high accuracy)

Variant B
(TelMA Torque with covered sensor, for harsh environment)

Weight 10 g

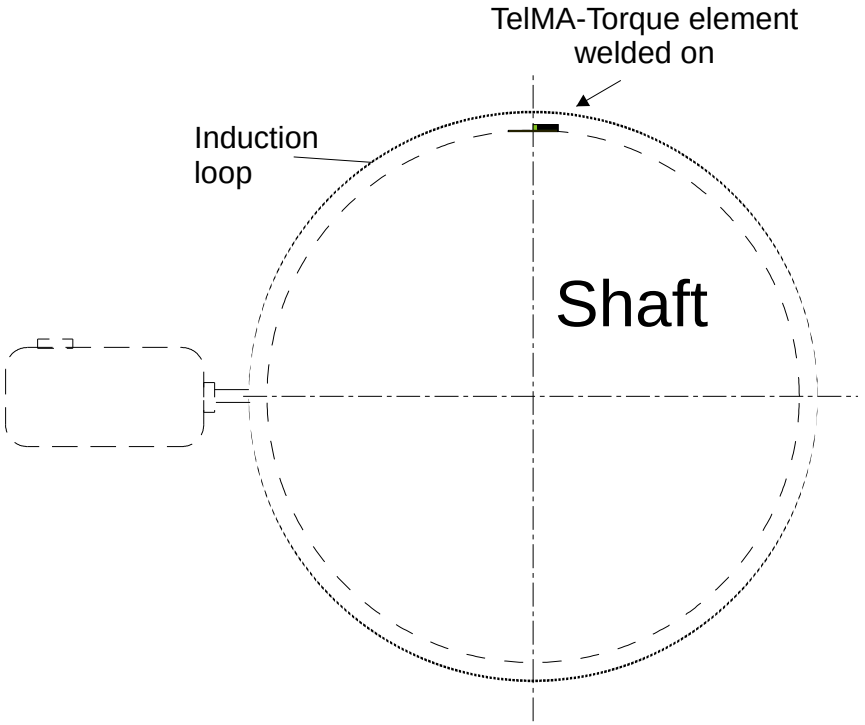
Assembly process

TelMA Torque Element
(with integrated telemetry interface)

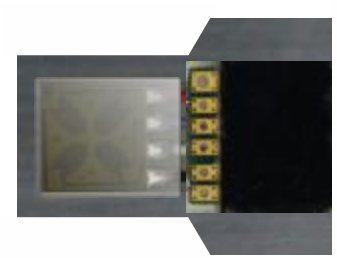


- easy assembly by means of micro spot welding process
- extremely robust assembly
- oil resistant
- short assembly time
- no soldering necessary
- no gluing necessary

Rotor kit for torque measurement with bending moment-free shafts



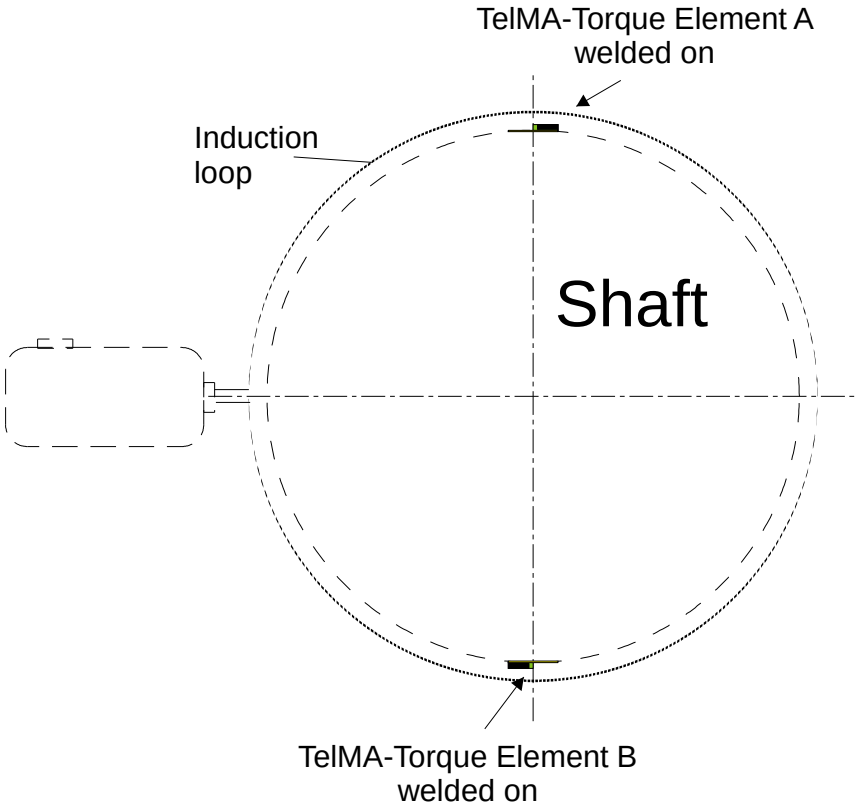
TelMA-Torque Element



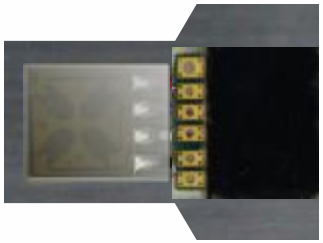
mounted axial

Rotor kit for torque measurement with bending moment compensation

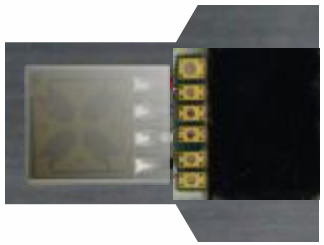
For shafts with additional bending moment load



TelMA-Torque Element A



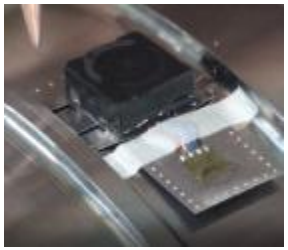
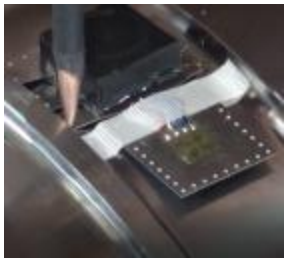
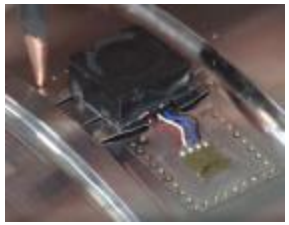
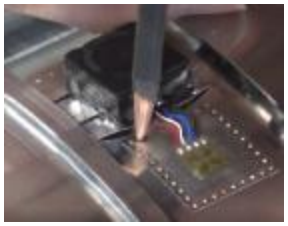
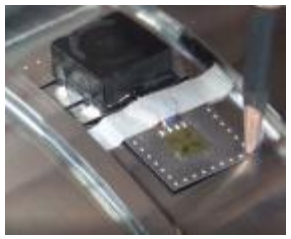
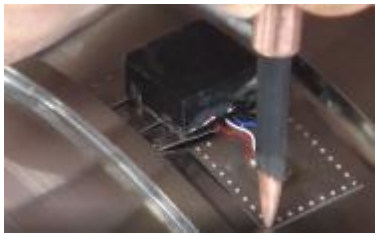
TelMA-Torque Element B

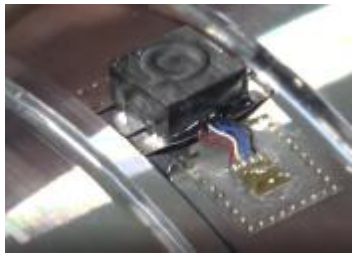


Simplest assembly TelMA Torque Element

(Assembly by means of micro-welding process, without damaging the shaft properties - assembly time: approx. 2.5 minutes)

Start 00:00:00

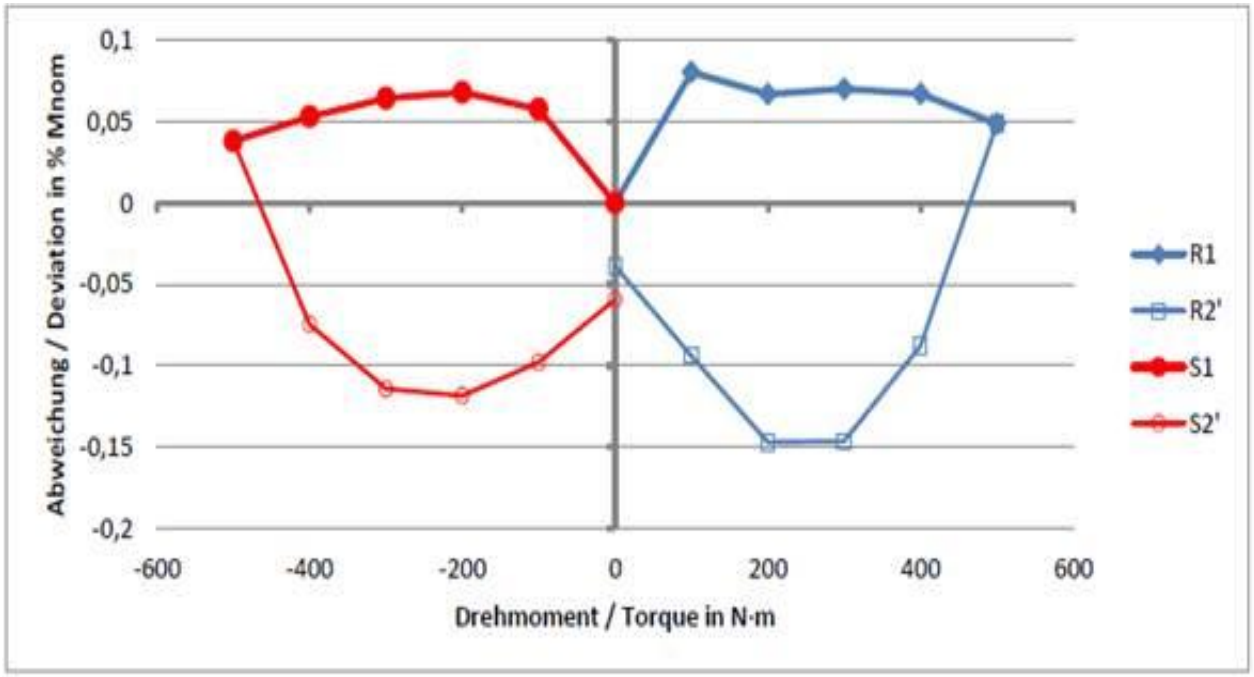


See also video

Manner Sensortelemetrie - TelMA Torque
Link zum Video auf YouTube
https://www.youtube.com/watch?v=Pckj1uNXHek

End: 00:02:40

Linearity and hysteresis behaviour with bending moment compensation

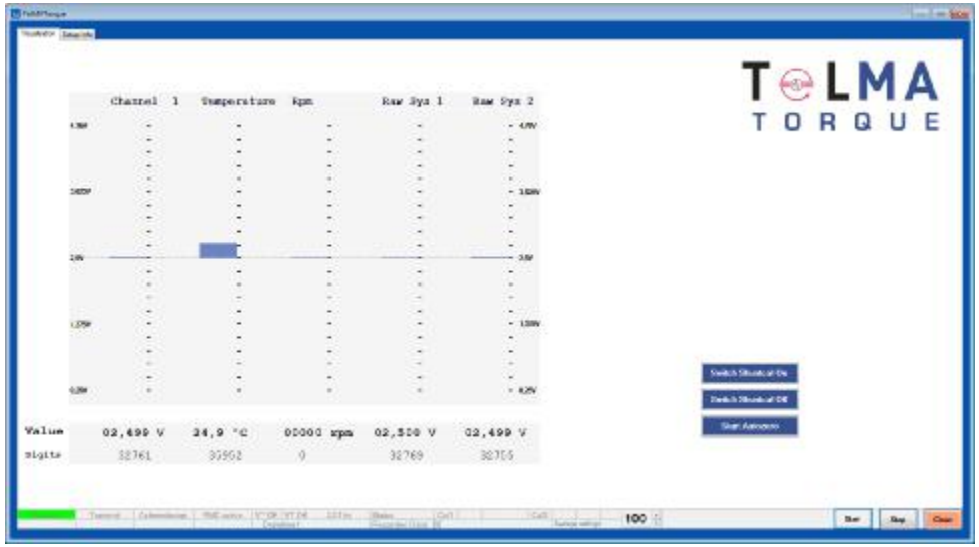


>> excellent values if shaft material is of good quality

Remote software for calibration and installation verification

(optional)

Setting, Health Monitoring and Auxiliary Memory



- Easy to use via USB interface box
- Integrated calculation tool for setting the measuring range
- Possibility to store information on the TelMA-Torque element
- Setting of measuring range, data rate, additional information
- Health monitoring functions such as Shunt-Cal (sensor check), temperature or supply voltage

- Optional: Data-Recording

Advantages over magnetic methods

- large transmission distance (shaft - pick up)

- insensitive to magnetic fields

- no problem with shaft currents in hybrid or electric drives

- free choice of material (no need for ferromagnetic materials)

- no influence of shaft displacements/radial vibrations on the measuring signal

- good measuring signal quality even with low torsional stresses

- Higher accuracy by a factor of ten

Technical data - TelMAX Torque

Technology: Torque detection on shaft by means of TelMA torque sensor element(s) for long distance stator – rotor
Compensation of bending moment influences
Components: TelMA Torque Element(s), Rotor Induction Loop and Stator with Pick Up
TelMA-Torque Element
Telemetric sensor element based on strain gauge technology
Assembly: Micro welding technology
Signal resolution: 14 bit
Signal bandwidth: 1 kHz(-3dB)
Contactless transmission: inductive sensor telemetry PCM via rotor induction ring
max. zero drift (electronics): 0.05 %/10°K (with electronic drift compensation)
max. gain drift (electronics): 0.02%/10°K
max. linearity error (electronics): 0.001%.
Integrated integrity check (remote shunt calibration)
Electronically adjustable measuring range and auto zero adjustment
Applicable shaft diameter range: 30..500 mm
Max. Ambient temperature range (rotor): -25 to +120°C (option -45..160°C)
Max. radial load: 5 000 g
Rotor size (amplifier): 15 x 30 x 3.5 mm
Protection class depending on enclosure: IP42 ..IP67
Weight: 3,5g
Stator
AW with integrated compact pick-up, distance stator - rotor 0..> 20 mm, shaft diameter 23 ..1000 mm)
Power supply: 9..30 Volt +/- 10 %, 250 mA
Output signal (torque): 0..5 Volt (zero point at 2.5V)/ current 4 ..20 mA, CAN (option)
Residual ripple: 20 mVss
Integrated temperature recording (can only be evaluated via digital interface)
Optional integrated speed measurement
Max. Ambient temperature range (stator): -25 to +70°C (optionally 90 °C)
Housing size:118 x 64 x 35 mm
Protection class: IP67