Transducers, electronics, software, services

Safely acquiring torque

... with the complete HBM measurement chain

Measuring torque with HBM …
Results that you can rely on

In test benches, process control, research and development:

Torque is a significant key parameter in numerous applications. You can rely on torque measurement technology from HBM – the guarantee for measurement results that you can trust:

- Worldwide number one in torque measurements for decades
- Integrated transducers, electronics and software from one source
- Comprehensive expert know-how: with competent consultation and services in over 60 countries

From robust transducers for simple tasks to high precision digital torque measuring systems:

HBM is your reliable partner for all applications where torque is measured.

… in test bench engineering

Securing technology leadership, guaranteeing high quality

To test the technologies of the future, engineers need to get high quality, robust and reliable data from their test benches.

That's why the world's leading automotive companies rely on HBM for trustworthy results when measuring torque on engine, roll and transmission test benches for example.

… in production monitoring

100% production control, minimum down times

Torque is becoming the preferred indicator for connection quality in an increasing number of production and joining processes.

HBM's reliable torque measurement technology helps in the seamless monitoring of production – resulting in minimum down times.

Industry examples include viscosity monitoring in stirrers, granule processing or manufacturing automatic screwed joints.

... in drive and conveyor technology

High power output, optimally used

Speed and torque bring drive and conveyor technology up to speed – and ensure high power outputs.

The accurate acquisition of torque and speed is essential for optimizing drive systems. HBM measurement technology provides precision and reliability.

... in quality assurance

Total traceability, essential for ISO9001 certification

The traceability of test equipment is required to meet DIN ISO 9001 standards. HBM torque measurement technology ensures this requirement is easily met.

The HBM torque scale from 2 to 20,000 N·m is officially approved by the PTB (German Metrology Institute), making it possible to trace back measured parameters as required for your quality assurance.

... in research and development

Reliable data, accurate research results

Torque is based on force and the length of the lever arm – and is therefore a parameter that cannot always be easily and accurately generated.

This makes the reliable monitoring of torque particularly important, especially in research and development projects. HBM measurement technology provides security with its high quality recognized by global experts.

Application reports at... www.hbm.com/torque >>

Permanently in use worldwide …
Top technology for torque

T12: More than just a transducer – a complete torque measuring system!

The T12 digital measuring system is the world technology leader for safe and accurate acquisition of torque – tailored to meet the requirements of modern test bench technology.

- Precise measurement results with high dynamic bandwidth
- Greatest possible reliability thanks to intelligent self-diagnosis and process monitoring
- Quickly and easily integrated into existing system technology
- Simple and easy commissioning
- Highly economical: Transducer, electronics and software in one system

T22: The cost-effective measurement shaft for simple torque applications

T22 is the economical alternative when you do not need that last percentage of accuracy. T22 is particularly suitable for production and process control and can be connected directly to a PLC control.

- Dynamic and static torque measurement
- Ideal for simple torque applications
- Maintenance and wear-free, contactless operation

measurement

T40: The all-rounder, totally convincing in quality, performance and price

T40 is the first torque flange - worldwide - of its class to benefit from the advantage of secure digital data transfer between rotor and stator.

The advantage: Constantly reliable test results – even under difficult ambient conditions such as electromagnetic interference, vibration or temperature fluctuations. And all at a competitive price.

- Developed to meet the daily challenges on the test bench: Short design, high permissible parasitic loads for direct mounting on machine elements
- Long-term utilization due to analog and digital outputs (in combination with the TIM40 torque interface module).

The TIM40 interface module enables connection of T40 to fieldbus interfaces

Customer-specific torque transducers: Developed to meet your specifications

And if engineers have specific requirements for their torque measurement technology?

HBM develops and manufactures customized transducers to your specifications. Custom-made with the market leader's experience and high competence.

- Flexible in design and in quantity, small or large, with or without an integrated amplifier – it's your choice.
- Fast development and production – rapid engineering and rapid prototyping keep up the pace!
- Reliable DKD* calibration, ISO 9001 certification, two-year guarantee and competent HBM After Sales Service.

*) DKD = German Calibration Service

All advantages at a glance: **www.hbm.com/torque**

Torque transducers and measurement electronics ... ... a perfect combination

Torque transducer

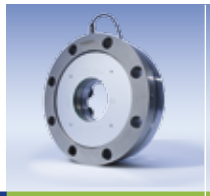
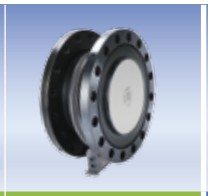
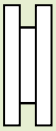
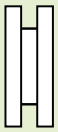
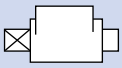
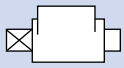
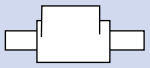
Features						Type
Transducer, non-rotating	Centric through-hole					TB1A
	Hermetically sealed					TB2
	Extremely high nominal (rated) torques					T10FH (Code N)
Transducer, rotating	Slip-ring transfer	Square				T4A
						T4WA-S3
		Shaft stub				T5
	Contactless, analog transfer	Bearing between rotor and stator				T20WN
						T20WN + VK20A
						T22FN
						T22FN + VK20A
		No bearings	High nominal (rated) torques	Compact design	Ultra-short length	T10F
					High nominal (rated) speeds	T10FS
					High nominal (rated) torques	T10FM
					Extremely high nominal (rated) torques	T10FH (Code L)
Transducer, rotating	Contactless, digital transfer	No bearings	Low rotor weight, low mass moment of inertia	Short overall length, robust		T40
				Short overall length, robust	Scaling, filtering, zeroing	T40 + TIM40
			Complete torque measuring system in a single transducer · High precision, high dynamics, high resolution · Recording of extreme values · Integrated monitoring functions (e.g. temperature, self-diagnosis, calibration data, etc.) · Scaling, filtering and zeroing of torque signal			T12 smarttorque

Measurement electronics

Measurement signals	Type	Features	Interfaces
	MC3	Budget measurement converter	Analog output
	MVD	Measuring amplifier for panel mounting with digital display	Analog output RS232/485
	ME	Standard Eurocards per DIN 41494	Analog output
	MGA	Budget analog multi-channel amplifier system for Eurocard modules	Analog output
	AED	Digital transducer electronics	RS232/485 Profibus DP CANopen DeviceNet
	CLIP	Electronics for control cabinet mounting on support rails	Analog output
	CLIP-IG	Budget industrial amplifier in a robust aluminum die-cast casing	Analog output
	digiCLIP	Amplifier for support rail mounting	CANopen Profibus DP
M_D n,	Spider8	Multi-channel PC-based measurement electronics	Printer port RS 232/485
M_D n,	PME	Industrial measurement amplifier system with computer-controlled or manual operation for mounting on standard rails	Analog output Digital I/O CANopen Profibus DP Interbus S
M_D n, CAN	MGCplus	Digital measuring amplifier system for laboratory and industrial use, with computer and PLC connections, manual control option, analog outputs and many additional functions	Analog output Digital I/O CANopen Profibus DP RS232/485 USB Ethernet TCP/IP
M_D n, CAN	QuantumX	8-channel, multi-functional, compact amplifier system	Ethernet Firewire

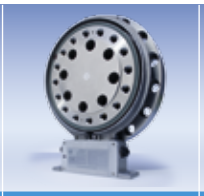
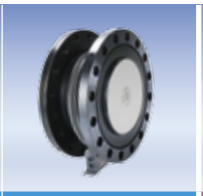
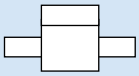
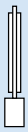
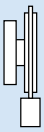
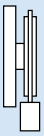
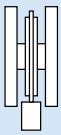
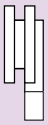
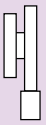
SG (resistance) full bridge
Frequency (torque)
Voltage
Current
Frequency/pulse (speed, angle of rotation)
CANopen
Profibus DP
Ethernet

Torque transducers ...
... specifically for your application

						
Type	**TB1A**	**TB2**	**T10FH (Code N)**	**T4A**	**T4WA-S3**	**T5**
Transducer	**Non-rotating**					
Signal	**Analog**					
Torque application	 Flange	 Flange	 Flange	 Square as per DIN 3121	 Square as per DIN 3121	 Shaft stub, friction locking
Accuracy class	0.05	0.03	0.1	0.1	0.1	0.1
Nom. (rated) speed [rpm] (acc. to measuring range)	–	–	-	4,000	4,000	4,000
Signal transmission	Fitted cable connection	Plug connection	Plug connection	Slip rings	Slip rings	Slip rings
Torque output signal	1.5 mV/V	1.0 mV/V	1.1 ... 1.9 mV/V	2 mV/V	2 mV/V	2 mV/V
Meas. of rotational speed					•	
Meas. of angle of rotation					•	
Output measurement						
Rotor temperature						
Vibration bandwidth [%]	120/160	160/200		70	70	70
Coupling option						
Nominal (rated) torque						
N·m	100N·m	500N·m		5 N·m	5 N·m	10 N·m 200N·m
kN·m	10 kN·m	10 kN·m	100kN·m 300kN·m	1 kN·m	1 kN·m	

Measurement flanges and shafts, rotating and non-rotating, with nominal (rated) measuring ranges from 0.1 N·m to 300 kN·m and rotational speeds of up to 16,000 rpm:

Select the suitable torque transducer for your application here.

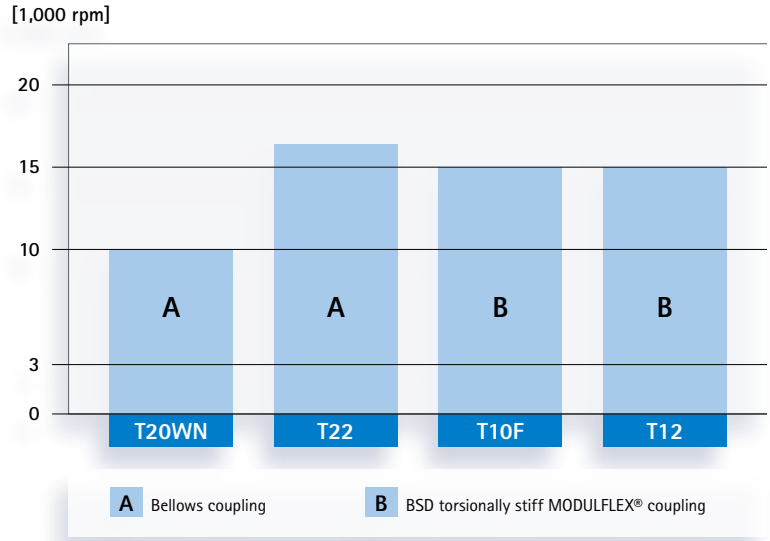
								
	T20WN	T22FN	T10F	T10FS	T10FM	T10FH (Code L)	T12	T40
	Rotating						Rotating	
	Analog						Digital	
								
	Shaft stub, friction locking	Shaft stub, friction locking	Flange	Flange	Flange	Flange	Flange	Flange
	0.2	0.5	0.1	0.1	0.1	0.1	0.03	0.05
	10,000	9,000 - 16,000	8,000 – 15,000	12,000 – 24,000	3,000 – 8,000	2,000 – 3,000	12,000 – 18,000	10,000 – 20,000
	Contactless	Contactless	Contactless	Contactless	Contactless	Contactless	Contactless	Contactless
	± 10 V	± 5V 10 mA ± 8 mA	10 kHz ± 5 kHz ± 10 V	10 kHz ± 5 kHz ± 10 V	10 kHz ± 5 kHz ± 10 V	10 kHz ± 5 kHz ± 10 V	10 kHz ± 5 kHz 60 kHz ± 30 kHz ± 10 V Profibus DP CANopen	10 kHz ± 5 kHz 60 kHz ± 30 kHz 240 kHz ± 120 kHz ± 10 V
	•		•	•	•	•	•	
	•						•	
							•	
							•	
	80	80	120 / 160 / 320	160 / 200	100		160/200	160/120
	•	•	•				•	
	0,1 N·m 200N·m	5 N·m 1 kN·m	50 N·m 10 kN·m	100N·m 10 kN·m	15 kN·m 80 kN·m	100kN·m 300kN·m	100N·m 10 kN·m	200N·m 3 kN·m

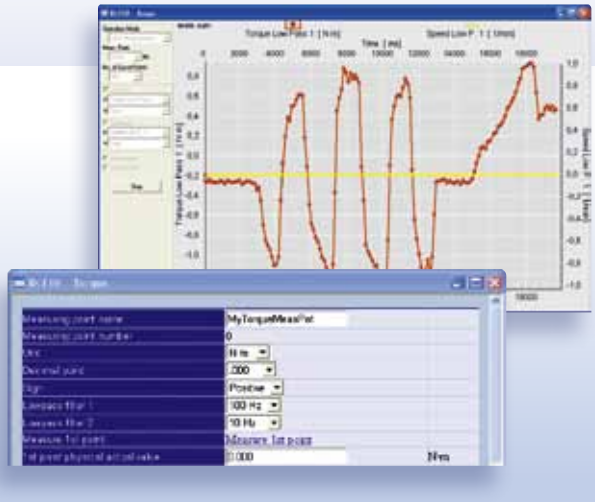
Maximum service life …
… with the right accessories

Flexible couplings

Flexible couplings simplify the installation of your HBM torque transducer. A flexible coupling also decouples unwanted interference effects from the shaft, ensures accurate measurement and extends service life.

We also supply fully assembled and tested sets complete with measurement shaft and coupling. Bellows couplings and multiple disc couplings are also available for all transducer types.





All from a single source: A smooth start for you

HBM not only provides transducers and electronics from a single source – we also supply the appropriate software and a comprehensive range of accessories for your torque transducers.

- Powerful, easy-to-use Assistant software
- Connection cables, cable sockets, etc.
- Transport cases, calibration certificates and much more … (dependent on model)

Accredited precision:
HBM torque calibration

Permanent safety and traceability

HBM operates one of the world's most modern laboratories for calibrating torque transducers:

___ Unique and largest range of calibration steps in the DKD* (2 N·m to 25 kN·m)

___ HBM was the first calibration laboratory in Germany and is leading the way in setting de facto national standards

___ Best measurement capability achieved worldwide outside national metrological institutes

Torque

Measuring range [1]	DKD* calibration				Working standard calibration			
	↺	↻	↺↻	Possible steps 5 8 10 6 A B	↺	↻	↺↻	Possible steps 6 10 C
0,5 N·m					•	•	•	■□
1 N·m					•	•	•	■□
2 N·m					•	•	•	■□
5 N·m					•	•	•	■□
10 N·m	•	•	•	■□□■	•	•	•	■□
20 N·m	•	•	•	■■□■	•	•	•	■■
50 N·m	•	•	•	■■■■	•	•	•	■■
100 N·m	•	•	•	■■■■	•	•	•	■■
200 N·m	•	•	•	■■■■	•	•	•	■■
500 N·m	•	•	•	■■■■	•	•	•	■■
1 kN·m	•	•	•	■■■■	•	•	•	■■
2 kN·m	•	•	•	■■■■	•	•	•	■■
3 kN·m	•	•	•	■■■■	•	•	•	■■
5 kN·m	•	•	•	■■■■	•	•	•	■■
10 kN·m	•	•	•	■■■■	•	•	•	■■
25 kN·m	•	•	•	■■■■	•	•	•	■■
up to 300 kN·m [2]	•			□■■□	•			■■
	Best measurement capability >0,008 %							

■ Standard offer
□ Not available
■ On request

A 4+3 increasing/decreasing series acc. to DIN 51309, EA10/14 or DKD-R 3-5

B 2+1 increasing/decreasing series acc. to VDI 2646

C 1+1 increasing/decreasing series

[1] In the range of 5 N·m up to 1 kN·m: for DKD*, steps of 1 N·m possible
In the range of 100 N·m up to 25 kN·m: for DKD*, steps of 100 N·m possible

[2] By external accredited laboratory

*) DKD = German Calibration Service **) PTB = German Metrology Institute

More about HBM calibration services: **www.hbm.com/calibration**

The entire world of torque measurement technology on the Internet...

at www.hbm.com/torque:

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free downloads

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available at the click of a mouse

___ Latest torque newsletters:
the latest technical information and useful
tips for measurement engineers

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measure and predict with confidence

HBM

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