

# A New Dimension of Precision

For optimum results in torque measurement



# Continuous Innovation



## Innovating for over 50 years

With over 50 years of experience, HBM sets standards in the field of torque measurement. HBM leads the global market in innovation and is continually developing new, state-of-the-art technologies. From non-contact torque transducers with energy and signal transmission to the torque measuring flange, and from the unique 400 kNm calibration machine to the high-precision T12HP transducer: HBM sets the benchmarks for torque measurement technology, with unwaveringly excellent results and maximum precision.





Calibration service up to  
**400 kNm**



# The precise measurement chain

## Reliable results measured with precision

From the robust transducer for simple measurement tasks to the high-precision digital torque measuring system: HBM has been the world leader in torque measurement for decades and is your one-stop shop for everything from calibration to transducers, to reliable data acquisition.



### Verifiable and individual

Professional calibration of your torque sensor is a vital prerequisite for ensuring the constant quality of your measurement results.



### Precise and future-proof

Precision torque transducers in combination with digital TIM-PN/EC interface modules are ideal for highly dynamic applications. Via the field bus, they enable torque and speed measurements to be incorporated with ease in higher-level test bench automation and control systems.



## Modular and flexible

Every application has its own special challenges. Stationary, on a test bench or in other special conditions: whatever the case, HBM can offer you the right data acquisition system for your sensor and your application.



# A new dimension of precision

At HBM, we develop and produce all the components of the measurement chain – and ensure maximum precision for sensors, amplifiers, and software. This harmonized system ensures that you can achieve the best possible results for any application.



## Automotive

Exact, precise measured values over the entire measuring range are vital in the automotive industry, whether for testing and optimizing engines, or reducing rolling resistance to increase efficiency.



## Shipping

Fast and accurate torque measurement for reducing emissions is extremely important for the optimum running of gas and dual-fuel marine engines.



## Aviation

The requirements for speed and accuracy are stringent, e.g. for testing turbines, turbo propellers and turboshafts.

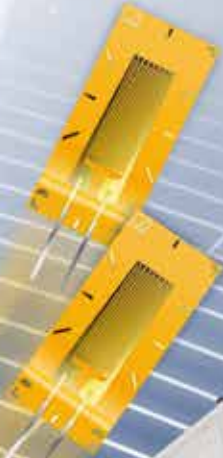


## Wind power

High torques are what count in wind energy. Precise measurement technology increases component efficiency under extremely high nominal torques.

## Unbeatable mechanical design

The intelligent design of the measuring body ensures high accuracy in terms of linearity and hysteresis, and therefore a precise measurement result.



## Incomparable high quality

HBM is one of the world's largest manufacturers of strain gages, and is also the leading specialist in putting them to optimum use in different torque transducer designs.

## Unchallenged leader in precision

With our expertise in optimum carrier frequency technology, HBM is launching the world's most precise amplifier onto the market.

# The HBM calibration laboratory: A global standard

The HBM calibration laboratory is one of the best known and best performing labs in the world. In 1977 it was the first calibration laboratory in Germany to be accredited by the DKD (German Calibration Service), and HBM regularly invests in expanding and enhancing the various systems. Calibration with DAkkS certificate or a verifiable working standard calibration by HBM: the choice is yours.

Measuring range* in N·m	0.1 N·m	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	400*** kN·m	up to 1.1 MN·m	
Working standard calibration	Possible increments																			
	10 C																			
	6 C																			
	3 C																			
DAkkS calibration	Possible increments																			
	6 B																			
	10 A																			
	8 A																			
	5 A																			

■ Standard offer

□ Not possible

■ On request, by an external accredited calibration laboratory

A 4+3 Increasing/decreasing series (DIN 51309, EA-10/14 or DKD-R 3-5)

B 2+1 Increasing/decreasing series (VDI 2646)

C 1+1 Increasing/decreasing series

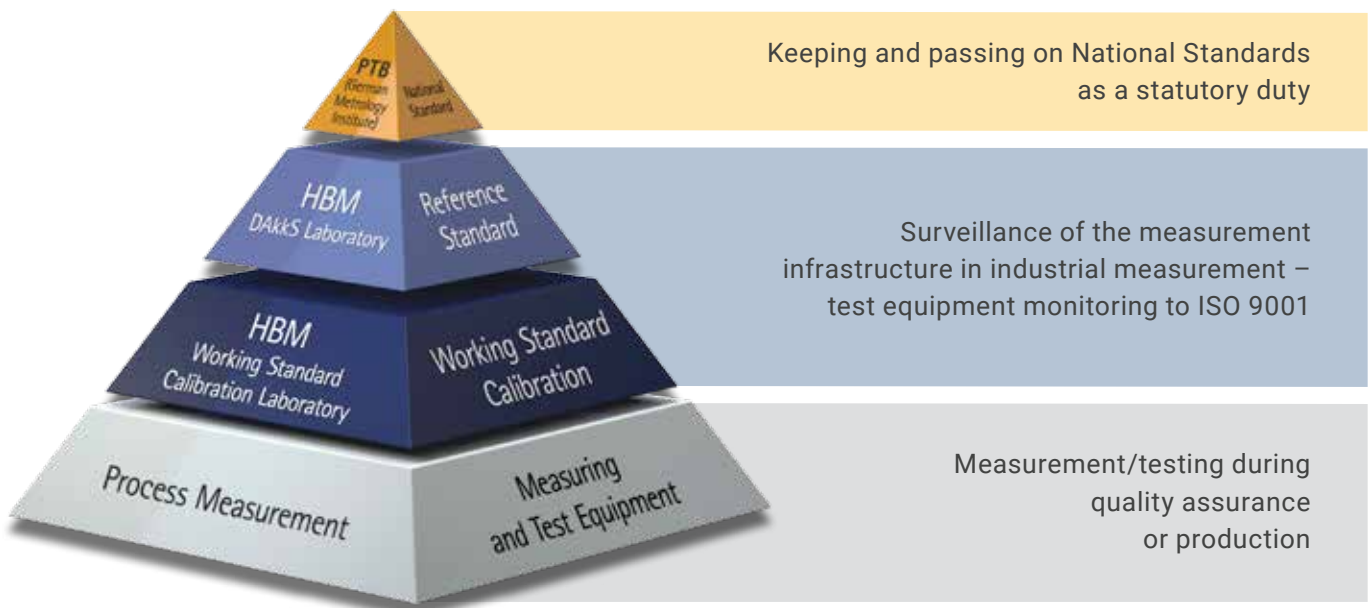
\* In the 5 N·m to 1 kN·m range: for DAkkS every increment at an interval of 1 N·m is possible

In the 100 N·m to 25 kN·m range: for DAkkS every increment at an interval of 100 N·m is possible

In the 3 kN·m and 400 kN·m range: for DAkkS every increment at an interval of 1 kN·m is possible

\*\* 3 increments only

\*\*\* No vibratory torque





# Looking for your own customized sensor? We can produce to your specification!

If our standard products are not the right option for you, we will design a solution completely in line with your ideas including design, verification, validation and manufacture of the final product – in large quantities, too.

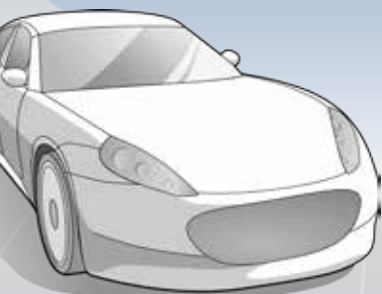
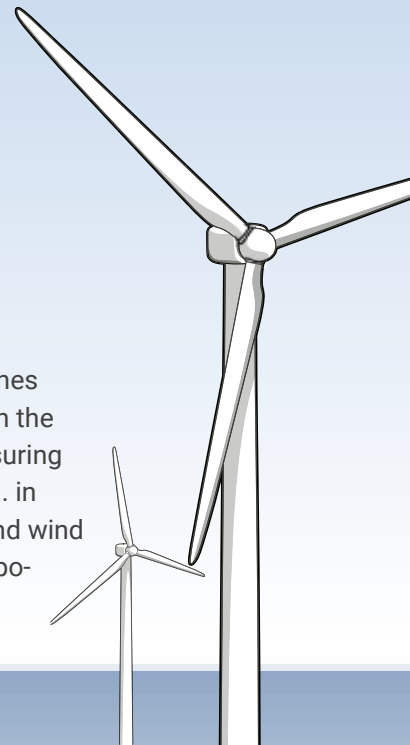
- Maximum precision is a must even at high speeds with high dynamics – in the aviation industry, too. Our in-house developed torque transducers ensure that you can conduct your measurements reliably and with the required accuracy.



- Complying with shipping emissions: By integrating the T40MAR torque transducer in the ship's drive train, you will significantly reduce the fuel feed while greatly increasing efficiency.



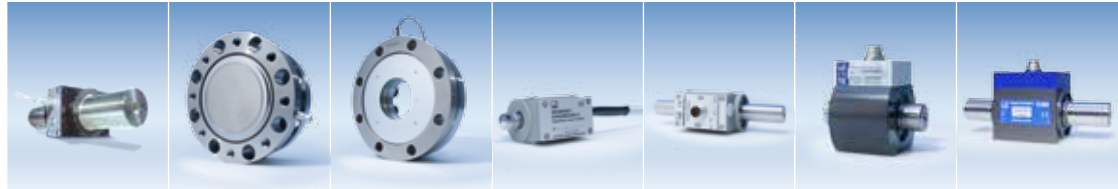
- HBM also accomplishes successful projects in the MNm range for measuring very high torques, e.g. in marine propulsion, and wind and gas turbine components.



- For optimum results in test drives, we develop, design and produce individual sensors to your specifications, e.g. Flexplate sensors. Additionally, we produce torque transducers with special mechanical interfaces, e.g. for measuring the prop shaft of trucks.



# Equal to any challenge




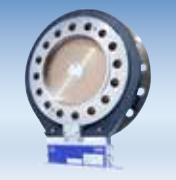

Type			TN	TB2	TB1A	T4A	T5	T22	T21WN
Signal transmission			Non-rotating			Rotating slip ring			
Nominal torque from ... to			100 Nm	100 Nm	100 Nm	5 Nm	10 Nm 200 Nm	0.5 Nm	0.1 Nm 200 Nm
Nm			20 kNm	10 kNm	10 kNm	1 kNm		1 kNm	
kNm									
Speed [rpm]		Standard	-	-	-	4,000		9,000/16,000/ 18,000/20,000 <sup>1)</sup>	13,500/19,000/ 20,000 <sup>1)</sup>
		Option	-	-	-	-		-	-
Accuracy [%]	Linearity incl. hysteresis	Standard	0.02	0.01	0.03	0.1		0.3	0.1
		Option	-	-	-	-		-	-
Temperature coefficients [%/10K]	Zero point	Standard	0.01	0.01	0.05	0.1		0.5	0.2
		Option	-	-	-	-		-	-
	Span	Standard	0.02	0.02	0.05	0.1		0.2	0.1
Output signal/rated output									
Torque	Frequency	Standard							
	Analog / mV/V	Standard	1.5 ... 2.0 mV/V	1 mV/V	1.5 mV/V	2 mV/V		±5 V / ±8 mA	±10 V / ±5 kHz
	Dig. signal (TMC)	Standard	-	-	-	-		-	-
Speed	Pulses/revolution	Option	-	-	-	-		-	360 <sup>2)</sup>
Angle of rotation (ref. pulse)			Option	-	-	-		-	-
Bus interface			Standard	-	-	-		-	-
			Option	-	-	-		-	-
Coupling			Option	-	-	-		✓	✓
Special features			<ul style="list-style-type: none"> <li>▪ Transfer transducer</li> <li>▪ Very high accuracy</li> <li>▪ Bending moment measurement</li> </ul>	<ul style="list-style-type: none"> <li>▪ Reference transducers</li> <li>▪ Very high accuracy</li> </ul>	<ul style="list-style-type: none"> <li>▪ Reference transducers</li> <li>▪ Compact</li> <li>▪ High rigidity</li> </ul>	<ul style="list-style-type: none"> <li>▪ Small, user-friendly</li> <li>▪ Square connection</li> </ul>	<ul style="list-style-type: none"> <li>▪ Small, user-friendly</li> <li>▪ Shaft stub</li> </ul>	<ul style="list-style-type: none"> <li>▪ Voltage output</li> <li>▪ Current output</li> <li>▪ Compact</li> </ul>	<ul style="list-style-type: none"> <li>▪ Integrated speed system</li> <li>▪ Small measuring ranges</li> <li>▪ Voltage output</li> <li>▪ Frequency output</li> <li>▪ High nominal speed</li> </ul>

1) Depending on measuring range

2) Optical speed measuring system

3) Magnetic speed measuring system

With a diverse range of torque transducers, HBM offers the right solution for everyone. HBM also produces customized transducers if required.

							
T10F	T40B	T12HP	T40FM	T40FH	T12HT	T40MAR	T40HS
Rotating non-contact							
50 Nm 10 kNm	50 Nm 10 kNm	100 Nm 10 kNm				10 kNm 400 kNm	100 Nm 3 kNm
			15 kNm 80 kNm	100 kNm 300 kNm	500 kNm 1.5 MNm		
8,000/10,000/ 12,000/15,000 <sup>1)</sup>	10,000/12,000/ 15,000/20,000 <sup>1)</sup>	10,000/12,000/ 15,000 <sup>1)</sup>	3,000/4,000/ 6,000 <sup>1)</sup>	2,000/3,000 <sup>1)</sup>	1,000	1,500 <sup>1)</sup>	45,000/35,000 <sup>1)</sup>
–	–	12,000/15,000/ 18,000 <sup>1)</sup>	4,000/6,000/ 8,000 <sup>1)</sup>	–	–	–	–
0.1	0.03	0.015	0.1	0.1	0.1	0.3	0.05
0.05	–	0.007	0.05	–	–	–	–
0.1 / 0.05 <sup>1)</sup>	0.05 / 0.1 <sup>1)</sup>	0.01	0.05	0.05	0.1	0.1	0.05
–	–	0.005	–	–	–	–	–
0.1	0.05 / 0.1 <sup>1)</sup>	0.02	0.1	0.1	0.1	0.1	0.05
±5 kHz	±5/±30/±120 kHz	±5/±30 kHz	±5/±30/±120 kHz	±5 kHz	±5 kHz	±5/±30/±120 kHz	±5/±30/±120 kHz
±10 V	±10 V	±10 V	±10 V	+/- 10V / 0.63...1.1 mV/V	±10 V	±10 V	±10 V
–	✓	–	✓	–	–	✓	✓
360/720 <sup>2)</sup>	1024 <sup>3)</sup>	360/720 <sup>2)</sup>	1024 <sup>3)</sup>	180 <sup>3)</sup>	96	–	–
–	✓	✓	✓	–	–	✓	✓
–	TMC	CAN	TMC	–	CAN	TMC	TMC
–	–	Profibus DP	–	–	–	–	–
✓	✓	✓	–	–	–	–	–
<ul style="list-style-type: none"> <li>• Compact</li> <li>• High rigidity</li> </ul>	<ul style="list-style-type: none"> <li>• High accuracy</li> <li>• Digital signal transmission</li> <li>• Highly dynamic</li> <li>• TIM40 interface module</li> <li>• TIM-EC EtherCAT module</li> <li>• TIM-PN PROFINET module</li> </ul>	<ul style="list-style-type: none"> <li>• Maximum accuracy</li> <li>• Digital signal transmission</li> <li>• Highly dynamic</li> <li>• Very high resolution</li> <li>• Diagnosis</li> <li>• Extreme values</li> <li>• Temperature measurement</li> <li>• TIM-EC EtherCAT module</li> <li>• TIM-PN PROFINET module</li> </ul>	<ul style="list-style-type: none"> <li>• Digital signal transmission</li> <li>• Highly dynamic</li> <li>• TIM40 interface module</li> <li>• TIM-EC EtherCAT module</li> <li>• TIM-PN PROFINET module</li> </ul>	<ul style="list-style-type: none"> <li>• Very high torques</li> <li>• Non-rotating version available</li> <li>• TIM40 interface module</li> <li>• TIM-EC EtherCAT module</li> <li>• TIM-PN PROFINET module</li> <li>• Digital signal transmission</li> <li>• Highly dynamic</li> </ul>	<ul style="list-style-type: none"> <li>• Very high torques</li> <li>• High accuracy</li> <li>• Profibus interface</li> <li>• Speed system</li> <li>• Digital signal transmission</li> </ul>	<ul style="list-style-type: none"> <li>• Marine certificate</li> <li>• Very high torques</li> <li>• High accuracy and dynamics</li> <li>• Digital signal transmission</li> <li>• Torque Interface Module</li> </ul>	<ul style="list-style-type: none"> <li>• Very high accuracy</li> <li>• Speed up to 45,000 rpm</li> <li>• Digital signal transmission</li> <li>• Highly dynamic</li> <li>• Lightweight titanium body</li> <li>• TIM40 interface module</li> <li>• TIM-EC EtherCAT module</li> <li>• TIM-PN PROFINET module</li> </ul>





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measure and predict with confidence

