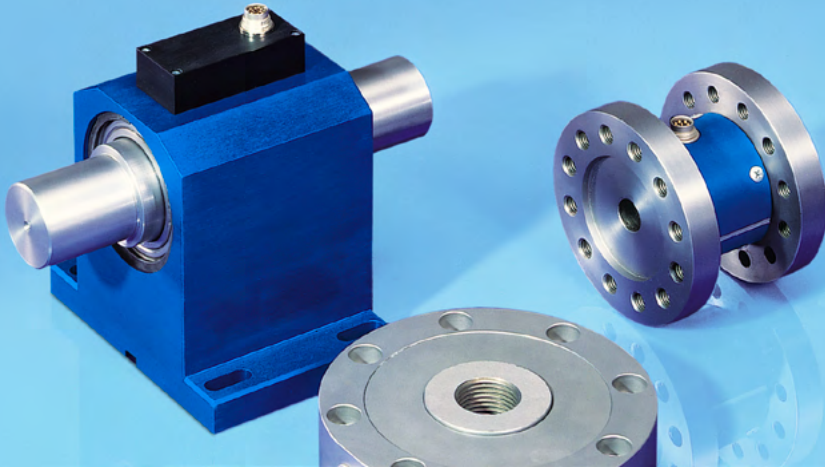




Torque Sensors
Force Sensors
Multi-Component Sensors



Sensor Interfaces
DIN Mounting Rail Devices
Built-In Measuring Devices
Portable Measuring Systems
Tabletop and Laboratory Measuring Devices



Highly precise sensors for torque and force measurement which are applied in research, development, production, quality assurance and series production are our primary contribution to the measurement technology.

We make high demands on the quality of our products. By the good contact to our customers, our products are subject to continuous enhancement; thereby we break new ground to meet our customers requirements.

Index

Our Products

Product Overview of Sensors	4
Technical Specification of Torque Sensors	6
Technical Specification of Force Sensors	16
Technical Specification of Multi-Component Sensors	24
Product Overview of Amplifiers	26
Sensor Interfaces	28
Tabletop and Laboratory Measuring Devices	29
DIN Mounting Rail Devices	30
Built-In Measuring Devices	31
Test Benches	32

Our Service

Calibrations	34
Repairs	35
Strain Gauges (SG) Application	35

Product Overview of Sensors

We offer rugged and reliable sensors in various versions and measurement ranges in accordance to the respective application requirement. Additionally, our product range includes a wide choice of accessories, such as couplings, measuring cables,

Torque Sensors

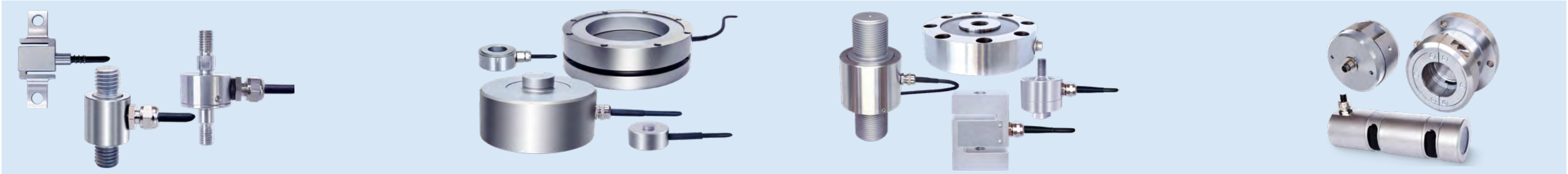


Reactive Torque Sensors, Non-Rotating

Rotating Torque Sensors with Slip Rings

Rotating Torque Sensors with Non Contact Transmission

Force Sensors



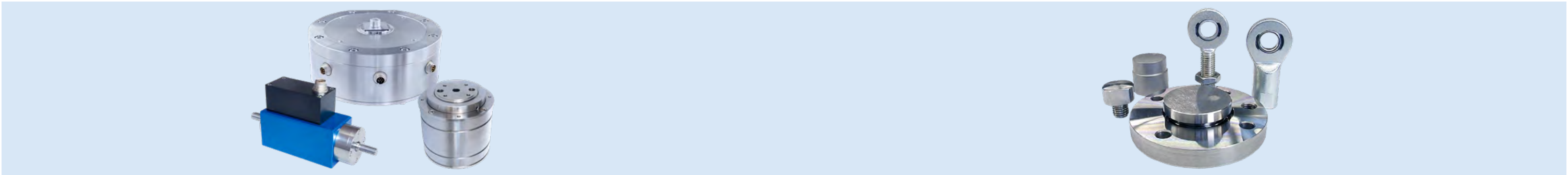
Tension Force Sensors

Compressive Force Sensors

Tension and Compression Force Sensors

Special Sensors

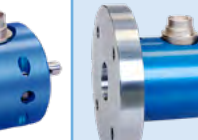
Multi-Component Sensors

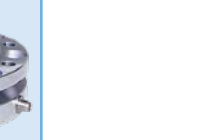


Accessories



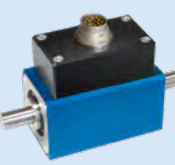
Technical Specification of Torque Sensors

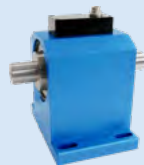
Reactive Torque Sensors, Non-Rotating						
Type	D-2452 D-2452-P	DK-15	DV-14	D-2431	DH-15	DFW-25
Mechanical Connection	Cylindrical shaft Cylindrical shaft with keyway	Cylindrical shaft with keyway	Male square drive / Female square drive	1/4" hexagon drive / Quick change chuck	Flange with spigot and female threads / Cylindrical shaft	Flange with center hole and mounting holes / Cylindrical shaft with keyway
Measuring Range [N·m]	0.005 ... 20000	1 ... 100	1 ... 5000	0.1 ... 20	0.005 ... 20	2 ... 2000
Accuracy Class	0.1 (0.05)	0.2	0.2 (0.1)	0.2	0.2 (0.1)	0.2 (0.1)
Output Signal [mV/V]	0.3 ... 1.5	1	0.5 1	1 2	0.3 ... 1	1
Excitation [V]	2 ... 12	2 ... 12	2 ... 12	2 ... 12	2 ... 12	2 ... 12
Range of Application	Reaction torque measurement, e.g. for extruders	Reaction torque measurement, e.g. test stands	Survey of assembly tools for screws and nuts	Survey of assembly tools for screws and nuts	For very small measuring ranges	Compact design

					
DFW-35	D-2223	D-2209	D-2553	DF-30	D-2268
Flange with center hole and mounting holes / Square	Flange with center hole and mounting holes / Square socket	Flange with spigot and mounting holes at both ends	Flange with large through hole and center counter bore at both ends	Flange with center hole and female threads at both ends	Flange with spigot and female threads / Flange with center and through hole, mounting holes
2 ... 2000	2 ... 5000	1 ... 5	10 ... 200	10 ... 20000	50 ... 10000
0.2 (0.1)	0.2 (0.1)	0.2	0.1	0.1 (0.05)	0.1 (0.05)
1	1	1	1	0.5 1	0.5 1
2 ... 12	2 ... 12	2 ... 12	2 ... 12	2 ... 12	2 ... 12
Survey of assembly tools for screws and nuts	Survey of assembly tools for screws and nuts	Compact design	Compact design	Compact design	Short design

Rotating Torque Sensors with Slip Ring			Rotating Torque Sensors with Slip Ring for Screw Driving Systems		
Type	DR-2	DR-20	Type	DR-1	DR-12
Mechanical Connection	Cylindrical shaft with keyway	Cylindrical shaft with keyway	Mechanical Connection	Male square drive / Female square drive	Male square drive / Female square drive
Measuring Range [N·m]	1 ... 500	1 ... 500	Measuring Range [N·m]	1 ... 5000	1 ... 5000
Accuracy Class	0.1	0.1	Accuracy Class	0.1	0.1
Output Signal [mV/V]	0.5 1	0.5 1	Output Signal [mV/V]	0.5 1	0.5 1
Excitation [V]	2 ... 12	2 ... 12	Excitation [V]	2 ... 12	2 ... 12
Max. Speed [min ⁻¹]	1000 ... 2000	1000 ... 2000	Max. Speed [min ⁻¹]	500 ... 2000	500 ... 2000
Speed / Angle Measurement	-	Standard	Speed / Angle Measurement	-	Standard

	
DR-2291	DR-2335
1/4" hexagon drive / Quick change chuck	1/4" hexagon drive / Quick change chuck
1 ... 20	1 ... 20
0.1	0.1
0.5 1	0.5 1
2 ... 12	2 ... 12
2000	2000
-	Standard

Non Contact Torque Sensors, Rotating					
Type	DR-3000 DR-3000-P	DR-2643 DR-2643-P	DR-2112 DR-2112-P	DR-2412 DR-2412-P	DR-2112-R DR-2112-R-P
Mechanical Connection	Cylindrical shaft Cylindrical shaft with keyway	Cylindrical shaft Cylindrical shaft with keyway	Cylindrical shaft Cylindrical shaft with keyway	Cylindrical shaft Cylindrical shaft with keyway	Cylindrical shaft Cylindrical shaft with keyway
Measuring Range [N·m]	0.1 ... 5000	0.1 ... 5000	0.1 ... 20000	0.1 ... 20000	0.1 ... 1000
Accuracy Class	0.1 (0.05)	0.1 (0.05)	0.1 (0.05)	0.1 (0.05)	0.2
Output Signal	± 25000 digits	± 5 V (± 10 V)	± 5 V (± 10 V)	± 25000 digits	± 5 V (± 10 V)
Supply [V]	4 ... 6 from USB	12 ... 28	12 ... 28	12 ... 28	12 ... 28
Max. Speed [min ⁻¹]	12000 ... 30000	12000 ... 30000	5000 ... 15000	5000 ... 15000	8000 ... 15000
Speed/Angle Measurement	Standard	Option	Option	Option	Option

					
DR-2412-R DR-2412-R-P	DR-2212 DR-2212-P	DR-2512 DR-2512-P	DR-2212-R DR-2212-R-P	DR-2512-R DR-2512-R-P	DR-2500
Cylindrical shaft Cylindrical shaft with keyway	Cylindrical shaft Cylindrical shaft with keyway	Cylindrical shaft Cylindrical shaft with keyway	Cylindrical shaft Cylindrical shaft with keyway	Cylindrical shaft Cylindrical shaft with keyway	Cylindrical shaft, without bearings
0.1 ... 1000	0.1 ... 20000	0.1 ... 20000	0.1 ... 1000	0.1 ... 1000	0.005 ... 150
0.2	0.1 (0.05)	0.1 (0.05)	0.2	0.2	0.1
± 25000 digits	± 5 V (± 10 V)	± 25000 digits	± 5 V (± 10 V)	± 25000 digits	± 5 V (± 10 V)
12 ... 28	12 ... 28	12 ... 28	12 ... 28	12 ... 28	12 ... 28
8000 ... 15000	3500 ... 15000	3500 ... 15000	7000 ... 15000	7000 ... 15000	20000 ... 30000
Option	Option	Option	Option	Option	Option (only speed measure- ment)

Non Contact Torque Sensors, Rotating					
Type	DR-2600	DR-2477 DR-2477-P	DR-2554	DR-2800	MR-12
Mechanical Connection	Cylindrical shaft, without bearings	Cylindrical shaft Cylindrical shaft with keyway	Disk hub, clamping ring hub, keyway hub, without bearings	Flange with spigot and female threads/ Flange with center hole and mounting holes, without bearings	Center hole with keyway/ Driving shaft with flange and mounting holes
Measuring Range [N·m]	0.005 ... 150	0.2 ... 200	50 ... 1000	50 ... 5000	20 ... 5000
Accuracy Class	0.1	0.25	0.1	0.1	0.1
Output Signal	± 25000 digits	± 5 V (± 10 V)	± 5 V (± 10 V)	± 5 V (± 10 V)	± 5 V (± 10 V)
Supply [V]	12 ... 28	12 ... 28	12 ... 28	12 ... 28	12 ... 28
Max. Speed [min ⁻¹]	20000 ... 30000	8000 ... 10000	7300 ... 13600	8000 ... 15000	5000 ... 12000
Speed/Angle Measurement	Option (only speed measurement)	-	Option (only speed measurement)	Option (only speed measurement)	Option

	Dual Range Torque Sensors				
DR-2481	Type	DR-2208 DR-2208-P	DR-2508 DR-2508-P	DR-2531 DR-2531-P	DR-2831 DR-2831-P
External and internal spline drive	Mechanical Connection	Cylindrical shaft Cylindrical shaft with keyway	Cylindrical shaft Cylindrical shaft with keyway	Cylindrical shaft Cylindrical shaft with keyway	Cylindrical shaft Cylindrical shaft with keyway
260	Measuring Range [N·m]	0.5/5 ... 2000/20000	0.5/5 ... 2000/20000	0.5/5 ... 2000/20000	0.5/5 ... 2000/20000
0.5	Accuracy Class	0.1	0.1	0.1	0.1
± 10 V	Output Signal	± 5 V (± 10 V)	± 25000 digits	± 5 V (± 10 V)	± 25000 digits
12 ... 28	Supply [V]	12 ... 28	12 ... 28	12 ... 28	12 ... 28
15000	Max. Speed [min ⁻¹]	5000 ... 15000	5000 ... 15000	3500 ... 12000	3500 ... 12000
-	Speed/Angle Measurement	Option	Option	Option	Option

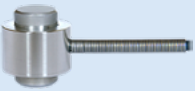
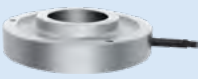
Non Contact Torque Sensors, Rotating for Screw Driving Systems						
Type	DR-3001	DR-2113	DR-2413	DR-2493	DR-3003	DR-2153
Mechanical Connection	Male square drive/Female square drive	Male square drive/Female square drive	Male square drive/Female square drive	Male square drive/Female square drive	1/4" hexagon drive/Quick change chuck	1/4" hexagon drive/Quick change chuck
Measuring Range [N·m]	0.1 ... 5000	0.1 ... 5000	0.1 ... 5000	0.1 ... 5000	0.1 ... 20	0.1 ... 20
Accuracy Class	0.1	0.1	0.1	0.25	0.1	0.1
Output Signal	± 25000 digits	± 5 V (± 10 V)	± 25000 digits	± 5 V (± 10 V)	± 25000 digits	± 5 V (± 10 V)
Supply [V]	4 ... 6 from USB	12 ... 28	12 ... 28	12 ... 28	4 ... 6 from USB	12 ... 28
Max. Speed [min ⁻¹]	1000 ... 4000	1000 ... 4000	1000 ... 4000	1000 ... 4000	3000 ... 4000	3000 ... 4000
Speed/Angle Measurement	Standard	Option	Option	Option	Standard	Option

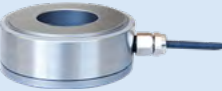
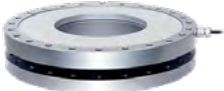
						
DR-2453	DR-2494	DR-2114	DR-2414	DR-2124	DR-1986	DR-1987
						DR-1988
1/4" hexagon drive/Quick change chuck	1/4" hexagon drive/Quick change chuck	1/4" hexagon drive/Quick change chuck	1/4" hexagon drive/Quick change chuck	External and internal spline drive	Male square drive/Female square drive	Male square drive/Female square drive
0.1 ... 20	0.1 ... 20	0.1 ... 20	0.1 ... 20	150 ... 500	1 ... 12	4 ... 80
						60 ... 240
0.1	0.25	0.1	0.1	0.3	0.3	0.3
± 25000 digits	± 5 V (± 10 V)	± 5 V (± 10 V)	± 25000 digits	± 5 V (± 10 V)	± 5 V (± 10 V)	± 5 V (± 10 V)
12 ... 28	12 ... 28	12 ... 28	12 ... 28	12 ... 28	12 ... 28	12 ... 28
3000 ... 4000	3000 ... 4000	3000 ... 4000	3000 ... 4000	2000	2000	2000
Option	Option	Option	Option	Standard	Standard	Standard

Technical Specification of Force Sensors

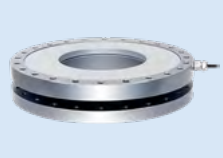
Tension Force Sensors				Force Transmissions	
Type	K-1107	K-100	K-1368	Type	EF, EM, EF42, E2, ED7, E3
Load Introduction/ Mechanical Connection	External threading at both ends	External threading at both ends	Link plates at both ends	Load Introduction/ Mechanical Connection	Diverse
Measuring Range [kN]	0.01 ... 0.2	1 ... 100	0.01 ... 0.2		
Accuracy Class	0.2	0.3	0.2		
Output Signal [mV/V]	0.5	1	1		
Excitation [V]	2 ... 6	2 ... 6 ... 2 ... 12	2 ... 6		
Range of Application	Miniature sensor, e.g. for survey of rope force or force determination of a bowden wire	Force sensor, e.g. for solar wing control or rope force measurement	Miniature sensor, e.g. for force determination of belt tensioners	Range of Application	Force transmissions, thrust pieces and mounting flanges

Compressive Force Sensors					
Type	K-22	K-1613	K-13	K-13B	K-450
Load Introduction/ Mechanical Connection	Load button in rocker pin design/ Bearing surface	Load button in rocker pin design/ Mounting side with female threads	Load button in rocker pin design/ Mounting side with female threads	Load button in rocker pin design/ Mounting side with female threads	Load button in rocker pin design/ Fixing hole, female threads on the mounting face
Measuring Range [kN]	0.05 ... 2	0.1 ... 50	0.01 ... 100	0.01 ... 100	1 ... 1000
Accuracy Class	0.5	0.5	0.5	0.5	0.1 ... 0.3
Output Signal [mV/V]	1	1	0.5 ... 1	0.5 ... 1	2
Excitation [V]	2 ... 6	2 ... 6 ... 2 ... 12	2 ... 6 ... 2 ... 12	2 ... 6 ... 2 ... 12	2 ... 12
Range of Application	Miniature sensor for shear force and press-in force measurement	Miniature sensor, e.g. for control of press-in force	E.g. for press-in force control, tablet presses	With overload protection e.g. for press-in force control, tablet presses	Universal compression sensor, e.g. for survey of surface pressure plates or press-in force

Compressive Force Sensors					
Type	K-2071	K-2283	K-2528	K-2529	K-14
Load Introduction/ Mechanical Connection	Load button in rocker pin design/ Mounting side with center hole	Plan surface at both ends	Plan surface with central through hole and mounting holes	Plan surface with central through hole and mounting holes	Plan surface with central through hole
Measuring Range [kN]	5 ... 15	50 ... 150	0.2 ... 10	0.5 ... 20	0.05 ... 100
Accuracy Class	0.3	1	1	1	0.5
Output Signal [mV/V]	1	1	1	1	1
Excitation [V]	2 ... 6	2 ... 12	2 ... 12	2 ... 12	2 ... 12
Range of Application	Miniature sensor, e.g. for industrial process control for press fitting, riveting, clinching, stamping	Miniature sensor, e.g. for pressing tools, impact measurements, crash testing, punch, stamping	E.g. for press-in force control	E.g. for press-in force control	E.g. for press-in force control

				Force Transmissions	
K-181	K-18	K-1250	K-2698	Type	EF, EM, EF42, E2, ED7, E3
Plan surface with central through hole	Plan surface with central through hole and spigot at both ends	External ring surface with spigot at the lower external ring	Plan surface with female threads at both ends	Load Introduction/ Mechanical Connection	Diverse
15 ... 1500	5 ... 5000	2 ... 100	100 ... 600		
1 ... 3	0.5	0.5	0.5 ... 1.0		
1	1	1	1		
2 ... 6	2 ... 12	2 ... 12	2 ... 12		
E.g. for preload measurement of screws	Small measured displacement < 0.1 mm, e.g. for press-in force control	E.g. for press-in force control	E.g. for industrial process control for press fitting, riveting, clinching, stamping, drawing	Range of Application	Force transmissions, thrust pieces and mounting flanges

Tension and Compression Force Sensors					
Type	K-1563	K-12	K-2145	K-1427	K-25
Load Introduction/ Mechanical Connection	External threading at both ends	External threading at both ends	External threading/Mounting face with female screw threads	External threading/Central internal screw thread	Internal threads at both ends
Measuring Range [kN]	0.1 ... 2	0.5 ... 1000	0.5 ... 200	0.5 ... 200	0.02 ... 50 (2 kg ... 5000 kg)
Accuracy Class	0.15 ... 0.3	0.1 ... 0.25	0.1 ... 0.25	0.1 ... 0.25	0.1 ... 0.2
Output Signal [mV/V]	1 ... 2	2	1 ... 2	1 ... 2	1 ... 2
Excitation [V]	2 ... 6 ... 2 ... 12	2 ... 12	2 ... 12	2 ... 12	2 ... 12
Range of Application	E.g. for material testing or rope force measuring	E.g. for tension/compressive testing machines or survey of actuating forces	E.g. for material testing or spring force measuring	E.g. for material testing machines or press-in force measurement	E.g. for tension/compressive testing machines

		Dual Range Sensor		Force Transmissions	
K-2698	K-11	Type	K-1882	Type	EF, EM, EF42, E2, ED7, E3
Plan surface with female threads at both ends	Plan surface with central internal thread, through holes for screws, fixing hole	Load Introduction/ Mechanical Connection	Plan surface with spigot and female threads at both ends	Load Introduction/ Mechanical Connection	Diverse
100 ... 600	0.5 ... 2000	Measuring Range [kN]	1/10 15/150		
0.5 ... 1.0	0.05 ... 1.0	Accuracy Class	0.2 ... 0.4		
1	2	Output Signal [mV/V]	1		
2 ... 12	2 ... 12	Excitation [V]	2 ... 12		
E.g. for industrial process control for press fitting, riveting, clinching, stamping, drawing	E.g. for material testing machines, press-in force measurement, roll force applications	Range of Application	E.g. for monitoring of assembly forces in the automobile industry	Range of Application	Force transmissions, thrust pieces and mounting flanges

Extract from Special Sensors					
Type	K-1661	K-2148	DZ-1	K-2565	K-1509
Load Introduction/ Mechanical Connection	Pin diameters	Spigot with mounting holes/ Center hole with clamping	Link plate with holes at both ends	Ergonomically shaped handle	Plan surface with mounting holes
Measuring Range	20 ... 400 kN	1 ... 2 kN	300 µm/m	1500 N	2 ... 20 N
Accuracy Class	1	0.5	0.5	0.1	0.2
Output Signal [mV/V]	1	0.5 ... 1	ca. 0.5	1	1
Excitation [V]	2 ... 12	2 ... 12	2 ... 12	2 ... 12	2 ... 6
Range of Application	Load measuring pin, e.g. for load measurement in deflector rolls	Web tension sensor, e.g. for tension measurement of belt conveyors in the paper industry	Stress sensor, e.g. for survey of press-in force, material stress or liquid level monitoring	Force sensor for hand force measurement (medical load cell)	Force sensor with very compact dimensions, e.g. for measurement of ball bearing friction

	Force Transmissions	
K-2618	Type	EF, EM, EF42, E2, ED7, E3
Around the circumference 3x 120°	Load Introduction/ Mechanical Connection	Diverse
30 ... 300 kN		
1		
1		
2 ... 12		
Force sensor, e.g. for measurement of tension forces in lathe chucks	Range of Application	Force transmissions, thrust pieces and mounting flanges

Technical Specification of Multi-Component Sensors

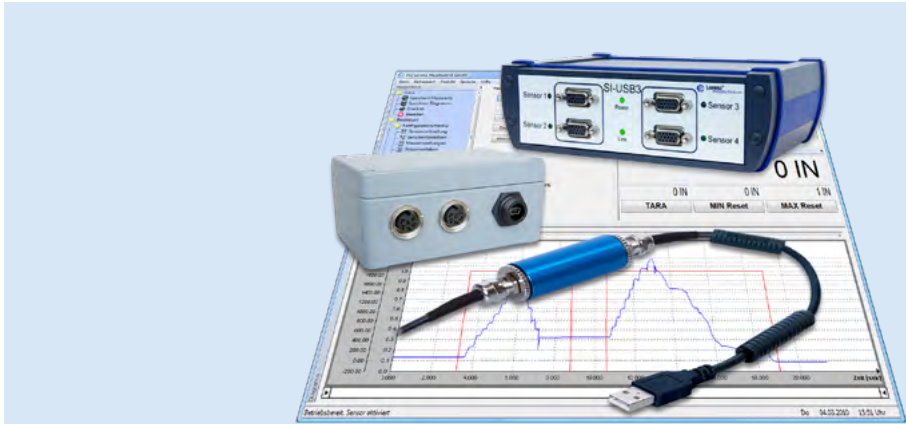
Reaction Torque/Force Sensors, Non-Rotating					
Type	M-2416	M-1902	M-2230	M-1983	M-2396
Load Introduction / Mechanical Connection	External thread/Spigot with female threads	Central female thread/Mounting surface at the major diameter with female threads	Central female thread/Mounting surface at the major diameter with female threads	Central female thread/Mounting surface at the major diameter with female threads	Flange with center hole and female threads at both ends
Measuring Range	0.1 N·m/20 N 0.5 N·m/50 N	100 N·m/ 100 N·m/ 100 kN	100 N·m/ 100 N·m/ 100 kN	60 N·m/ 60 N·m/ 40 kN	0.5 kN/5 N·m 1 kN/10 N·m 1 kN/30 N·m 20 kN/20 N·m 0.5 kN/50 N·m 2 kN/50 N·m
Accuracy Class	0.2 (F) 0.2 (Mt)	0.2	0.2	0.5	0.3 (F) 0.2 (Mt)
Output Signal [mV/V]	0.5	0.5	0.5	0.5	1
Excitation [V]	2 ... 8	2 ... 12	2 ... 12	2 ... 12	2 ... 12
Range of Application	E.g. the optimization of the granulation of abrasives	Screw testing: Thread and screw head friction torque, preload measurement	Screw testing: Thread and screw head friction torque, preload measurement	Screw testing: Thread and screw head friction torque, preload measurement	E.g. optimization of the cutting force of drills

		Non Contact Torque/Force Sensors, Rotating	
M-2025	M-2354	Type	M-2371
Spigot with female threads/Plan surface with female threads	Plan surface with center hole and female threads at both ends	Load Introduction / Mechanical Connection	Shaft end with keyway/external thread
10 kN/10 N·m 20 kN/20 N·m	10 kN/10 N·m	Measuring Range	2 N·m/100 N 5 N·m/250 N 5 N·m/500 N
0.2 (F) 0.2 (Mt)	0.2 (F) 0.2 (Mt)	Accuracy Class	0.4 (F) 0.2 (Mt)
1	1	Output Signal	± 5 V (± 10 V)
2 ... 12	2 ... 12	Supply [V]	12 ... 28
E.g. survey of the characteristics of elastomers	E.g. survey of the bearing friction of ball bearings	Max. Speed [min ⁻¹]	3000
		Measurement of Speed/Angle	Option

Product Overview of Amplifiers

For sensors, measurement technology and automation we manufacture the right measuring amplifier for every application.

Thus, you can measure your sensor signals reliably and with high precision and process the measured data evaluations with our configuration and evaluation software.



Sensor Interfaces



Tabletop and Laboratory Measuring Devices



DIN Mounting Rail Devices

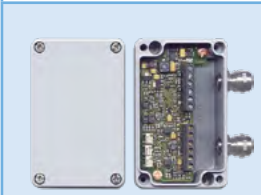
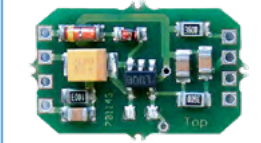
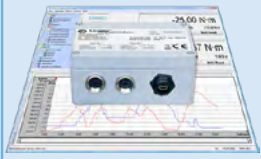


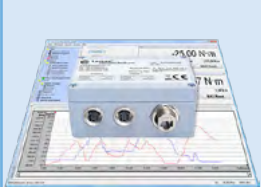
Built-In Measuring Devices



Portable Measuring Systems

Sensor Interfaces

Analog	Type	Technical Details
	LCV	The strain gauge (SG) sensor interface serves for the conversion of SG-based sensor (e.g. force and torque sensors or load cells) output signals to normed voltage signals of $\pm 5\text{ V}$, $\pm 10\text{ V}$, $0/4 \dots 20\text{ mA}$, $10\pm 10\text{ mA}$ or $12\pm 8\text{ mA}$ for the direct connection to e.g. a PLC or production machine.
	SI	The strain gauge (SG) measuring amplifier is suitable for the conversion of SG-based sensor (e.g. force and torque sensors or load cells) output signals to normed voltage signals of $\pm 5\text{ V}$, $\pm 10\text{ V}$, $0/4 \dots 20\text{ mA}$, $10\pm 10\text{ mA}$ or $12\pm 8\text{ mA}$ for the direct connection to e.g. a PLC or production machine.
	LMV	The strain gauge (SG) measuring amplifier converts the output signals from SG-based sensor (e.g. force and torque sensors or load cells) into normed voltage signals of $1 \dots 9\text{ V}$ or $5\pm 4\text{ V}$ for the direct connection to e.g. a PLC or production machine.
Digital	Typ	Technical Details
	LCV-USB3	USB sensor interface with freely available configuration and evaluation software VS3: The evaluation and excitation of the connected sensor occurs via the USB interface of the PC. Sensors with output signals of mV/V, $\pm 5\text{ V}$, $\pm 10\text{ V}$, $0/4 \dots 20\text{ mA}$, $10\pm 10\text{ mA}$ or $12\pm 8\text{ mA}$ are suitable for the connection.
	SI-USB	2 channel USB sensor interface with freely available configuration and evaluation software VS3: The evaluation and excitation of the connected sensor occurs via the USB interface of the PC. Sensors with output signals of mV/V, $\pm 5\text{ V}$, $\pm 10\text{ V}$ or $0/4 \dots 20\text{ mA}$ are suitable for the connection.
	SI-RS485	2 channel RS485 sensor interface with freely available configuration and evaluation software VS3: The evaluation and excitation of the connected sensor occurs via the RS485 interface. Sensors with output signals of mV/V, $\pm 5\text{ V}$, $\pm 10\text{ V}$ or $0/4 \dots 20\text{ mA}$ are suitable for the connection.

Digital	Type	Technical Details
	SI-ETH	2 channel Ethernet sensor interface with freely available configuration and evaluation software VS3: The evaluation and excitation of the connected sensor occurs via the Ethernet interface of the PC. Sensors with output signals of mV/V, $\pm 5\text{ V}$, $\pm 10\text{ V}$ or $0/4 \dots 20\text{ mA}$ are suitable for the connection.
	SI-USB3	4 channel sensor interface with freely available configuration and evaluation software VS3: The evaluation and excitation of the connected sensor occurs via the USB interface of the PC. Sensors with output signals of mV/V, $\pm 5\text{ V}$, $\pm 10\text{ V}$, $0/4 \dots 20\text{ mA}$, $10\pm 10\text{ mA}$ or $12\pm 8\text{ mA}$ are suitable for the connection.

Tabletop and Laboratory Measuring Devices

	Type	Technical Details
	PAX LC-TG	Micro-processor controlled display device in small housing, for passive and active signals, RS232 interface
	GM 80-TG	Measuring amplifier with data logger for up to 3000 measured values for active and passive sensors, with adressable RS232 bus, 3 control inputs for external control, 10 sensor parameter sets, fast measurement of up to 1000/s and with freely available configuration and evaluation software GM80-VS2
	DD-2002	2 channel digital display for torque/speed, torque/angle or force/displacement measurement

DIN Mounting Rail Devices

	Type	Technical Details
	GM 40	Amplifier for strain gauge sensors for DIN mounting rails, voltage output or voltage and current output
	GM 42-MAX	Minimum and maximum value memory device for DIN mounting rails, with 0 ... ±10 V input universally applicable
	GM 44-GW	The limit value evaluation with 2 adjustable limit values, 0 ... ±10 V input, universally applicable
	CPJ/CPJ2S	Measuring amplifier for strain gauge sensors in 4- or 6-wire circuit for DIN mounting rails with voltage and current output, 4 parallel sensor connections, shunt calibration signal push button, low pass filter and 2 adjustable set points
	GM 62	Measuring amplifier for strain gauge sensors for DIN mounting rails with voltage output, 2 parallel sensor connections, external control, abatable clamps
	IPE 50 DIN	Digital weighing indicator with OIML-approval for DIN mounting rails, connection of up to 8 strain gauge sensors Output: RS485, RS232, PROFIBUS DP in option
	GM 41-NT	PSU (Power Supply Unit) for DIN mounting rail assembly with overload protection, output adjustable (23 ... 28.5 V). The GM41-NT is an efficient, primary switched mode power supply unit for use in switch cabinets, clip fastening TH 35-rail assembly in slim design. By its wide range input it is world-wide applicable. The GM41-NT complies with the EN 60335-1 standard.

Built-In Measuring Devices

	Type	Technical Details
	GM 80-PA	Measuring amplifier with data logger for up to 3000 measured values for active and passive sensors, with adressable RS232 bus, 3 control inputs for external control, 10 sensor parameter sets, fast measurement of up to 1000/s and with freely available configuration and evaluation software GM80-VS2.
	IPE 50 Panel	Digital weighing indicator with OIML-approval, connection of up to 8 strain gauge sensors Output: RS485, RS232, PROFIBUS DP in option
	PAX	Programmable industry-digital built-in measuring devices
	PAX-DP	Programmable 2 channel industry built-in measuring devices

Portable Measuring Systems

	Type	Technical Details
	GM 77	DC voltage measuring amplifier for strain gauge sensors, mains-independent, a 4½ digit LCD-display, calibration control switch and maximum value memory
	GM 80	Measuring amplifier with data logger for over 15000 measured values for active and passive sensors, USB interface, RS232 interface, 10 sensor parameter sets, fast measurement of up to 1000/s, mains-independent and with freely available configuration and evaluation software GM80-VS2
	AL 202	Measuring amplifier, latest generation V7 with data logger function for D7 sensors (passive sensors with mV/V output signal and D7 plug), sensor specific parameters in the digital measurement plug, fast measurements up to 1000/s, mains-independent

Test Benches

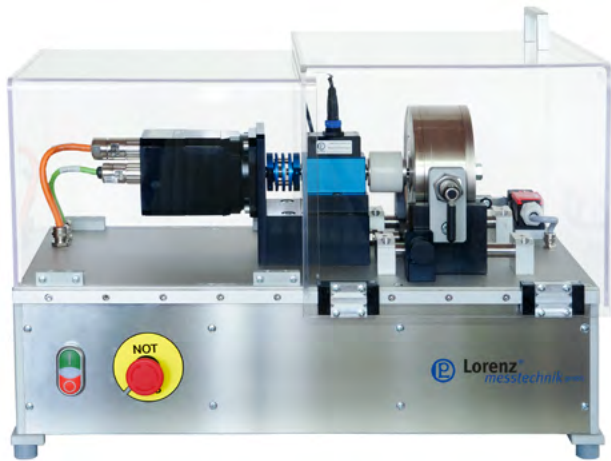
We provide customized system solutions and test benches such as torque test benches, electric motor test rigs, force test stands, automotive test rigs and characteristics detection, from development to finished product, everything from one source.

Torque Test Benches

Electric Motor Test Rigs

Force Test Stands

Automotive Test Rigs



Test Bench for Determination of the Torque Characteristics of Fixation Bearings:

- Measurement of the drag loss and the rotational speed
- Determination of the torque characteristics in response to the rotational speed



DC-Low-Voltage Motor Test Bench:

- Measurement of torque, number of revolutions, voltage and current
- determination of the mechanical and electrical performance and the efficiency



Test Bench for Measuring Tension and Compression Forces:

- Electromechanical drive via recirculating ball screw
- Maximum measuring force: 100 kN
- Maximum height of useable space: 500 mm
- Maximum useable space between the pillars: 260 mm
- Maximum traverse path: 250 mm



Friction Torque Test Rig
Testing Parameter:

- Torque
- Rotational Angle
- Temperature
- Speed

Do you have any questions about our test benches or products? Please write to us or give us a call. Our competent staff will be happy to help and answer your questions.

Calibrations

Lorenz Messtechnik GmbH is a manufacturer of force and torque sensors, as well as a supplier of load cells and systems for sensor signal processing and has its own accredited calibration laboratory according to DIN EN ISO/IEC 17025.

DAkkS-Calibration Laboratory for Torque Sensors

The torque standard of our accredited calibration laboratory is used as the reference standard for our torque calibration devices which are inserted within production.

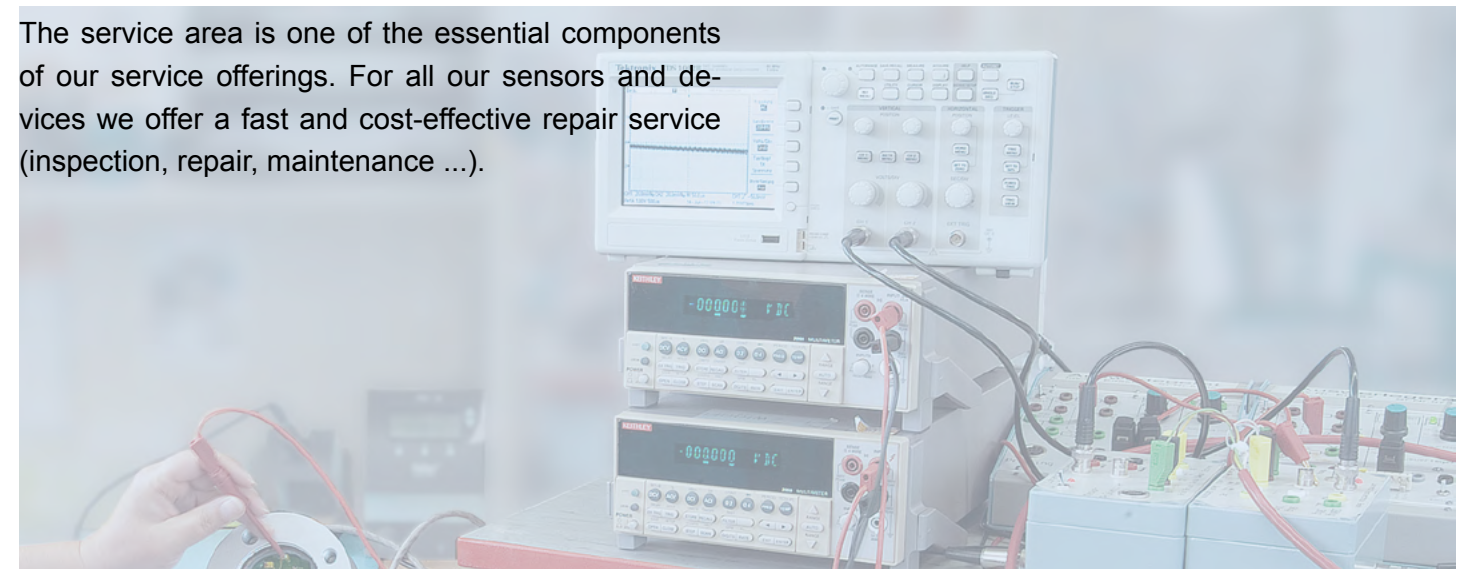
- Torque Measuring Range 1 N·m - 200 N·m
- Uncertainty of Measurement $1 \cdot 10^{-4}$



For our products we offer DAkkS and proprietary calibrations. Proprietary calibrations are carried out with working standards which are subject to regular inspection equipment monitoring. Our calibration spectrum includes measured variables such as **force**, **torque**, **rotation angle** and **voltage ratio**.

Repairs

The service area is one of the essential components of our service offerings. For all our sensors and devices we offer a fast and cost-effective repair service (inspection, repair, maintenance ...).



Strain Gauges (SG) Application

With the aid of a strain gauge, strains and stresses in material can be determined, which enable conclusions to be drawn about the stress of the component. We conduct professional in-house SG applications on

your components tailored to your specific needs. Thanks to our employees' many years of experience in the field of SG application, we ensure the highest quality and a very long life of the measurement points.

Examples:

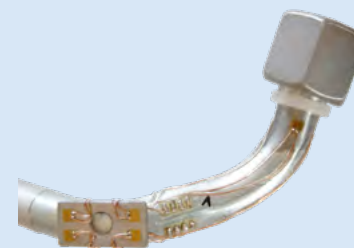
Strain Gauge Application on Clamp



Strain Gauge Application on Holding Bracket



Strain Gauge Application on Oil Line



Strain Gauge Application on Tie Rod



Lorenz *sensors worldwide*

Our quality management system ensures quality at the highest level:



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